Chemical Industries

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CURRENT OPINION

Rise of Synthetic Has Postwar Implications

The rise of synthetic rubber has important implications for postwar industry. It is still impossible to forecast the "balance of power" between synthetic and natural rubber when Far Eastern rubber again becomes available in volume, but experience in 1944 has confirmed the belief that after the war natural and synthetic rubbers will be in competition over a wide field.

The last prewar market price of natural rubber from the Far East was 22 cents a pound, though we know that the eastern plantations could lay down rubber in New York at 10 to 12 cents a pound, and still make a reasonable profit.

While the average cost of all main-type synthetic rubber made to date is in excess of 30 cents a pound, it is significant that in certain plants it has been made at a cost of 14 cents a pound, exclusive of amortization and depreciation of plant.

If we were to add a cent a pound for amortization, another for storage and distribution charges, and allow for a reasonable profit, the price would be in the neighborhood of 20 cents a pound.

It should be remembered, however, that a simple cents-per-pound comparison can be misleading, because differences in processing costs between the two materials, and differences in finished-product performance must be taken into account.

The key fact is that America's synthetic rubber performance has provided an effective ceiling over future raw rubber costs, which is important to the goal of more and better products, wider markets, more jobs.—JOHN L. COLLYER, *president, The B. F. Goodrich Co., Akron, Ohio.*

Chemical Self-Sufficiency Attainable in West

Chemists have found that petroleum is a prolific source of raw materials which they are just beginning to feel familiar with. When they get really well acquainted, we will find ourselves with the basis for a petroleum chemical industry rivaling that of the coal tar industry.

It is entirely safe to say that the state of development of bulk chemicals from petroleum is such that complete self-sufficiency on the Pacific Coast is attainable. Phenols, alcohols, ketones, formaldehyde and acetic acid are a few of the more important of these basic chemicals which can be produced in practically unlimited quantities right here in the West whenever industrial progress requires them.—A. L. LYMAN, *a director of The California Research Corp., Los Angeles.*

Bridge the Gulf Between Scientist and Layman

New kinds of college courses to help bridge the gulf in understanding in this scientific age between the layman and the expert are badly needed.

The traditional training usually makes the scientific expert a narrow specialist who is politically and socially "illiterate," and leaves the layman, who usually is the public officeholder, with only a cloudy or with no understanding of the scientific method that dominates modern society.

For intelligent leadership, men in public life and the average voter should appreciate the scientific method. But instead they are inclined to leave to the experts anything involving scientific matters, and are puzzled or amused when the experts disagree or appear to disagree.

The customary college training in sciences is responsible in larger measure for the situation, for it gives the non-science student only a smattering of some one of the sciences or often leaves him with an aversion to science.

On the other hand, the training of the experts usually stresses specialization so severely that they are not taught the relation of their science to the other sciences, nor to the public welfare.

The result is that national or community policies are left to the decision either of specialists with a narrow viewpoint, or of amateurs incompetent of making valid decisions because they do not understand the underlying scientific principles and truths.

For the science student, the future expert, college training should broaden his viewpoint and understanding of other sciences than his chosen field, and give him a sound understanding of social questions through sociology, economics, and other subjects.

For the non-scientific student, there should be a different kind of course on the nature of science, a course that might well be made compulsory for all students.

Such training could impart the confidence, mingled with caution, that would suit men for a career of leadership in public life.—HARRY J. CARMAN, *Dean, Columbia College, New York, N. Y.*

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CHEMICALS INDISPENSABLE TO INDUSTRY AND VICTORY

WASHINGTON

T. N. SANDIFER *reporting*

'45 Outlook • More Rayon, Carbon Black • Production Shifts New Patent Unit • Technical Mission to Germany

Outlook for Chemicals in 1945

THE BEGINNING OF 1945 finds the civilian outlook for chemicals definitely affected for the worse by recent war events.

Reports from the war front have been carefully assessed, and in summary they are to this effect:

In addition to the load of recently accelerated requirements from the industry, including explosives, rubber components, tires, and nearly everything chemical, there is now a further burden of all these, and more. During all of 1945, at least, the full existing capacity of the chemical industry will be absorbed, and it will be necessary to add new facilities.

Extensive replacement of lost materials will mean further withdrawal of stocks previously available for civilian use. The universal application of chemicals to all categories of manufacture means that the curtailment will adversely affect civilian production during the coming year.

The new demands for chemical production will further aggravate already acute manpower situations, and in some quarters here, more drastic controls than at present are foreseen as a move to force available workers out of non-essential fields into war plants.

The outlook has so changed in fact, during December, that it resembles the approach to 1943, rather than 1945. This coming year bids to be the most severe of the war, apart from its destructiveness, in its demands on all industry.

Tire Program Enlarged

THE INCOMING YEAR FOUND THE War Production Board deploying to meet expanded production needs for the front. A greatly enlarged tire program is under way. There is a scheduled increase of about 6,000,000 heavy tires per year. Before the end of December, tire companies had been asked to report not later than January 2 how much of this increase each one could absorb.

The remaining output will be placed in production in at least one new plant, perhaps a second. War Production Board thinking is along the line of making some of its military and aircraft tires in the new tire facilities, allowing the industry plants to continue their present production.

It appears now that the tire program will force an increase in requirements for high tenacity rayon cord, and also carbon black. Expansion of facilities for both products is definitely anticipated at WPB, and new production capacity for other products involved is also considered likely.

Production Shifts Under Way

SOME SHIFTS are being made in the output of various war plants. Tire manufacturers who have been making cord for the cotton duck program are going back to tires. Petroleum plants which have been producing for the rubber program may be called in to meet accelerated high octane gasoline needs. In turn, this will put more emphasis on the alcohol stockpile than has been the case lately.

Only recently, two shut-down Ordnance plants were re-opened, not for explosives, but to make Army communications wire. The latter is now about a No. 3 item on the super-critical list, or rather it was before the German thrust. Due to inevitable losses, the supply abroad must be even further depleted. There will be a question in this case for somebody to determine: Shall the new production go on, or must there be a shift back to explosives?

Congress—MVA; Natural Gas; O.S.R.D.

THE INCOMING CONGRESS WILL HAVE TO go over a considerable area of legislative ground already covered in the last session. There will be a new Rivers and Harbors bill, which means revival of the Missouri Valley Authority proposal. Congress approved part of a high-priced flood control plan for the area, but left out the MVA feature. The President is reported interested in the latter sufficiently to press for its incorporation in the new bill.

The proposed Federal Power Commission investigation of the natural gas industry reserves and utilization is momentarily handicapped by the failure, at the last moment, of Congressional approval. The Commission apparently intends to proceed, anticipating that Congress eventually will provide funds. Meanwhile, industry representatives are reported to be planning a legislative program to meet present needs of the industry, without waiting for an investigation which ob-

viously would furnish grounds for holding up definite action in Congress until the FPC, or some other agency, made its findings.

One of the snags seen in the background, so far as the whole proposal is involved, is a strong feeling that the FPC investigation would not cover enough territory. What FPC apparently is seeking to determine is the effect the natural gas industry has in competition with coal and other fuels. It is pointed out that this touches only one side of the competitive situation—how about the impact of coal, oil, and other fuels on the natural gas industry?

In the closing days of the last session, the Senate Judiciary Committee reported favorably HR. 4446, to exempt certain personnel within the Office of Scientific Research and Development from liability to prosecution under certain laws (which laws were meant to apply to regular Government personnel who enter private business and practice before the Federal Departments within a specified time.) It was not intended that temporary personnel in the OSRD, on loan from their businesses or institutions, should have been involved, and the present bill would protect their interests.

The Senate Committee on Patents reported favorably the bill HR. 82 for registration and protection of trade marks under certain conditions. This was placed on the calendar, and faces action in the new Congress.

The tariff on coconuts was suspended for the duration of war, in a last-minute act of Congress before adjournment.

Reconversion Census

THIS PROJECT WAS LOST in the closing days of the last session but will be pushed in the new Congress. The President's budget message will seek funds, and it is known that major manufacturing interests are watching the matter.

Foreign Mission to Study German Synthetic Fuels

THE BUREAU OF MINES HAS LAID PLANS to send a specially-assembled technical mission into Germany, as closely behind the Army as possible after the collapse of the enemy country, to rescue from destruction German technical secrets.

A request for funds to initiate this project attracted favorable attention from Congress recently. The experts would be obtained from sources outside the Government, as well as the technical services of the Government.

The theory is that with Germany having admittedly made great progress in this direction and developed synthetic fuels of considerable efficiency, it would save expense and effort if at the close of the war our own experts could get into the country and get at those formulas and processes. The military forces have been directed to preserve such data and plants as far as practicable.

However, it is realized that Germans are not going to give any of these resources away if they can help it. It may be necessary for the American mission to assemble its reports from fragmentary information, records, and even fragmentary plants.

In view of later war news this idea took on a more abstract appearance from the way it looked when first presented, but the necessity of having trained men of the highest order ready and available when the time does come, is generally recognized.

Patent Office Expansion

A NEW UNIT IS PLANNED for the U. S. Patent Office, to administer the growing number of public patents available for licensing, as well as those owned privately which might now be under consideration by their owners for licensing. A number of the latter group, it is said, may have lacked the facilities to establish industrial contacts to exploit their developments.

The Patent Office, it is reported, is receiving inquiries from small manufacturers looking for things to produce with equipment they now have or expect to acquire at the end of the war. The war's end will find many more such potential producers of commodities and manufactured items.

It is estimated that approximately 100,000 patents would be presented for registration in the first year of operation under this set-up.

Cartel Fight on the Way

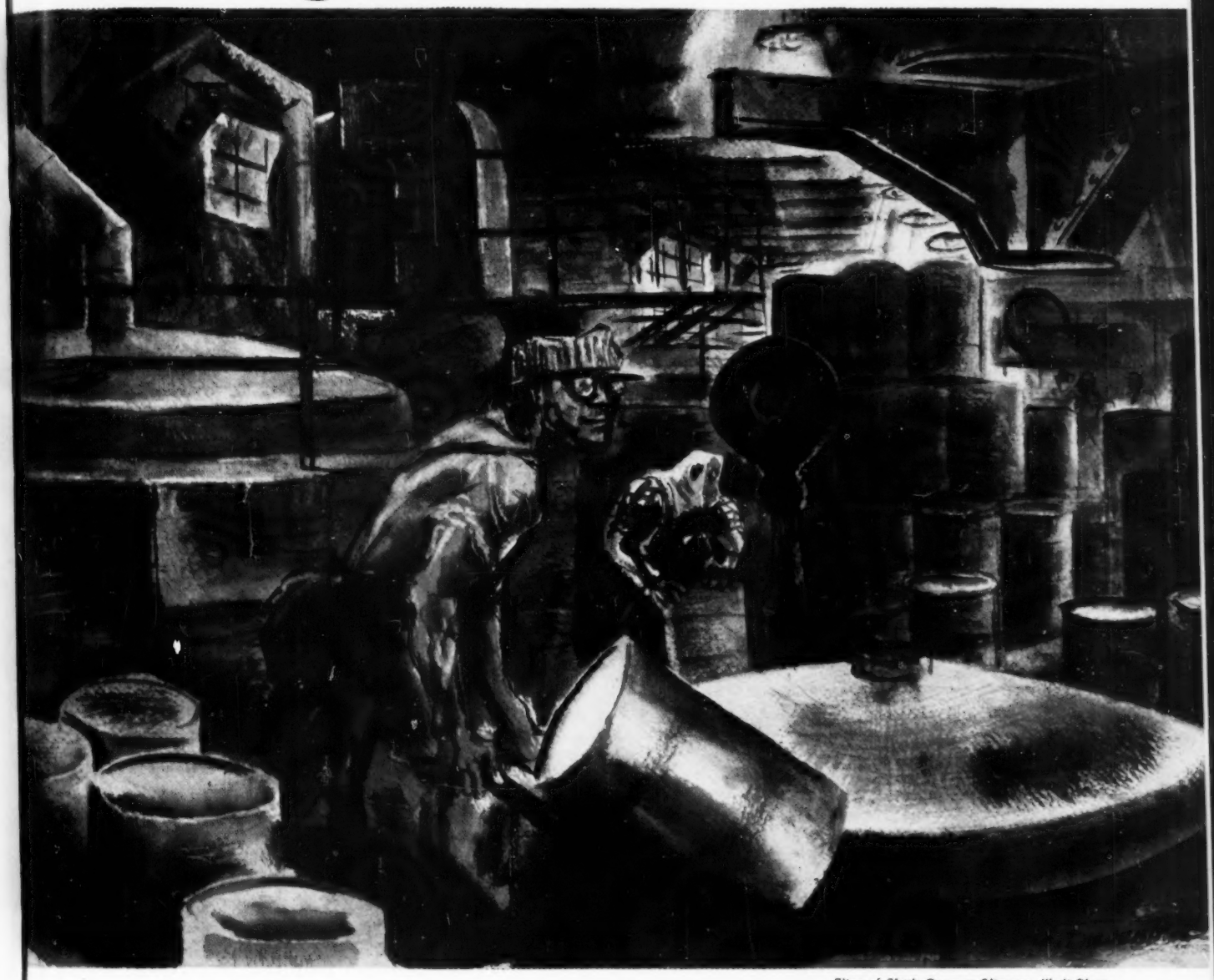
THERE ARE GROWING SIGNS that numerous individuals here, both within and outside the Administration, are girding for the coming battle that is expected to hammer out some sort of U. S. policy on postwar international trade, particularly with respect to cartels and this country's participation in them.

While nobody seems inclined to argue the case for cartels *per se* as an ideal way of doing business, there are emerging two distinct camps based on the old argument of expediency versus principle.

The anti's, headed by trust-buster Wendell L. Berge and his Department of Justice, take the position that cartels or any other entangling foreign trade alliances, in any form or for any purpose, are incompatible with the American system of free enterprise. The pro's, on the other hand, many of whom are high within the Administration itself, take the end-justifies-the-means stand that we are either going to have to participate in postwar division of world markets or be left out in the cold to play the field and buck subsidized and cheap-labor goods from other countries. Why not be realistic and go along, is the contention; we are going to need all the markets we can get after the war if we want to keep factories busy and private employment up.

There is a tendency among the pro group to get away from the word "cartel" on the basis that it has been so widely misused and misunderstood. We can therefore expect more talk of "cooperative international selling," "territorial marketing," and the like, but it will all be about the same thing.

Steady Hands . . .



View of Kettle Room at Niagara Alkali Plant

NIAGARA has greatly expanded its facilities to meet the enormous war demands for electro-chemical products. Thus as we turn to meet the growing peacetime requirements we remain "steady hands" at the job of producing materials for which Niagara has won an outstanding reputation as a quality house. This is assurance of continued good service and improved quality to those old customers who have relied upon Niagara for many years. And to new customers it means confidence in obtaining the highest standards of quality and the most experienced technical cooperation in the postwar era when electro-chemical products will be in increasing demand.

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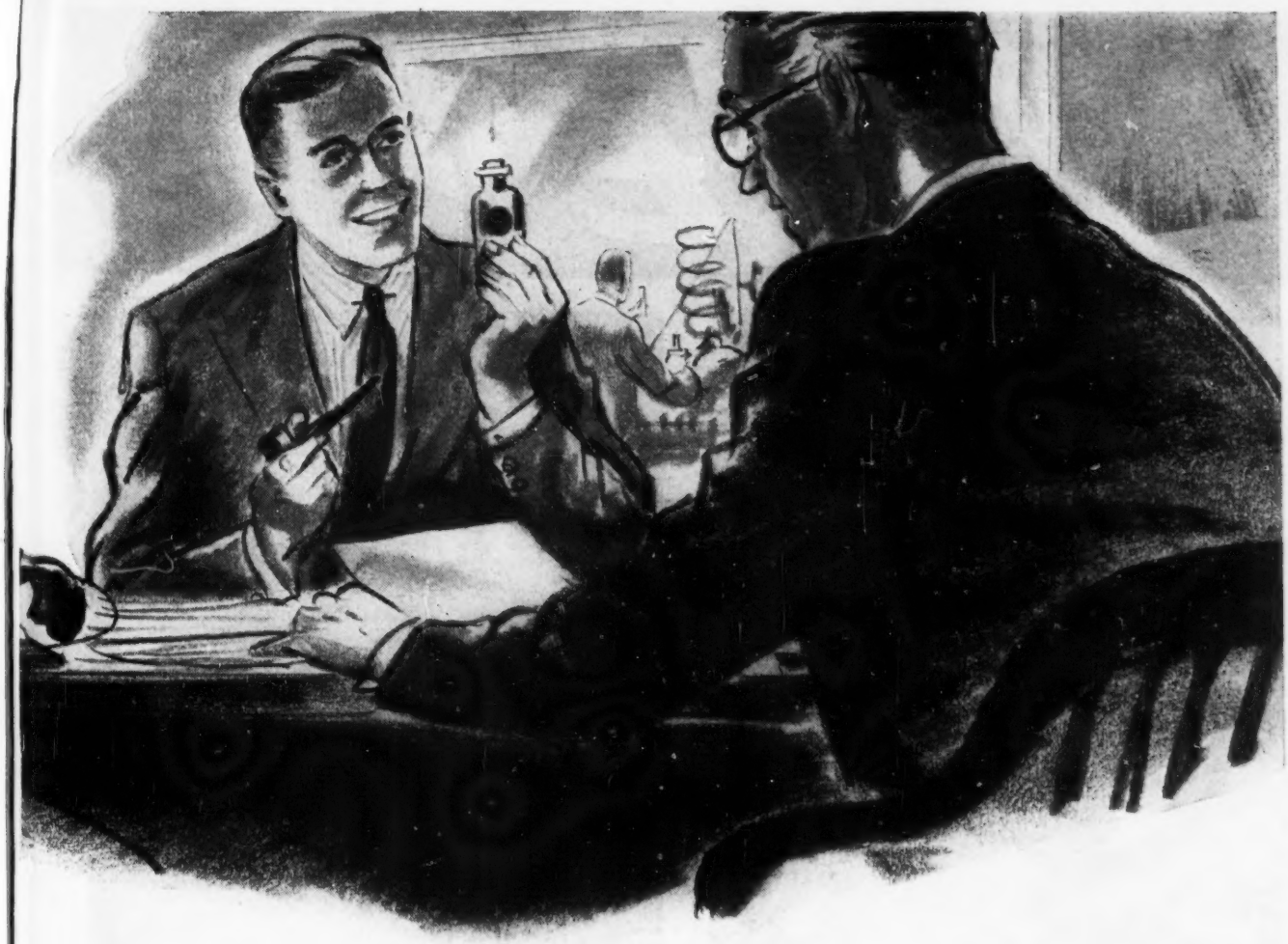

The Past points the Future!

To the chemist who remembers this country's production and use of coal-tar chemicals at the outbreak of World War I, progress since then seems almost incredible. Starting with the creation of America's great synthetic dye industry, coal-tar chemicals, of which more than 200,000 have been developed in the laboratory, are today being consumed in quantity by almost every industry.

New chemicals and new uses for old chemicals are developing at an ever-increasing pace. Scores of compounding materials, helping to make possible our vitally essential synthetic rubber industry. Many of the new life-saving sulfa drugs. Niacin, in the Vitamin B Complex. The new miracle insecticide, D.D.T. And finally, one of the most notable of modern chemical syntheses—the exact duplication of the complex quinine molecule.

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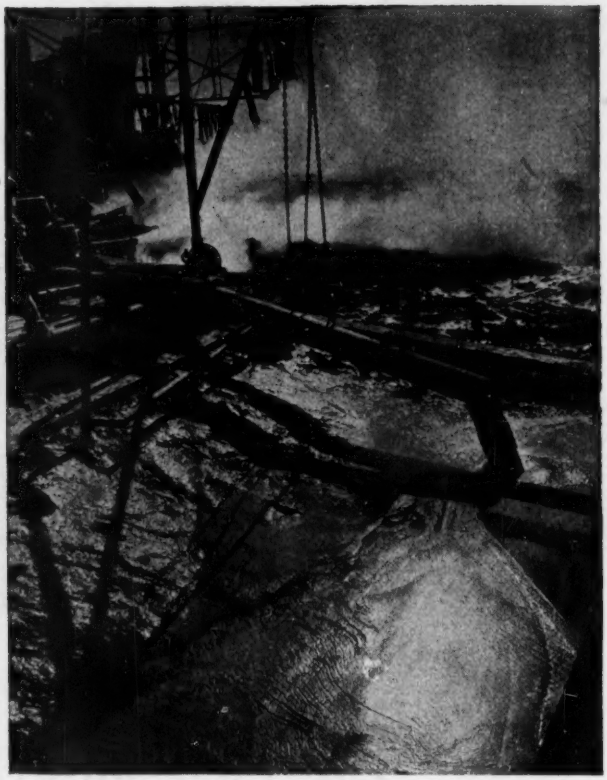
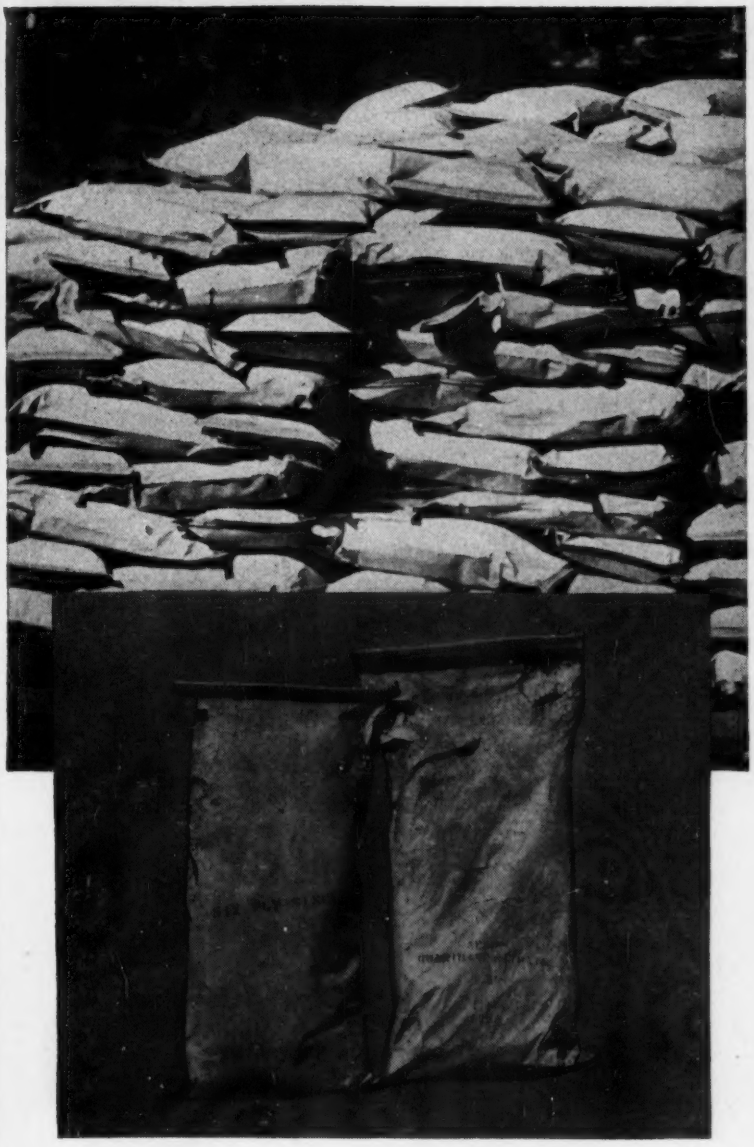


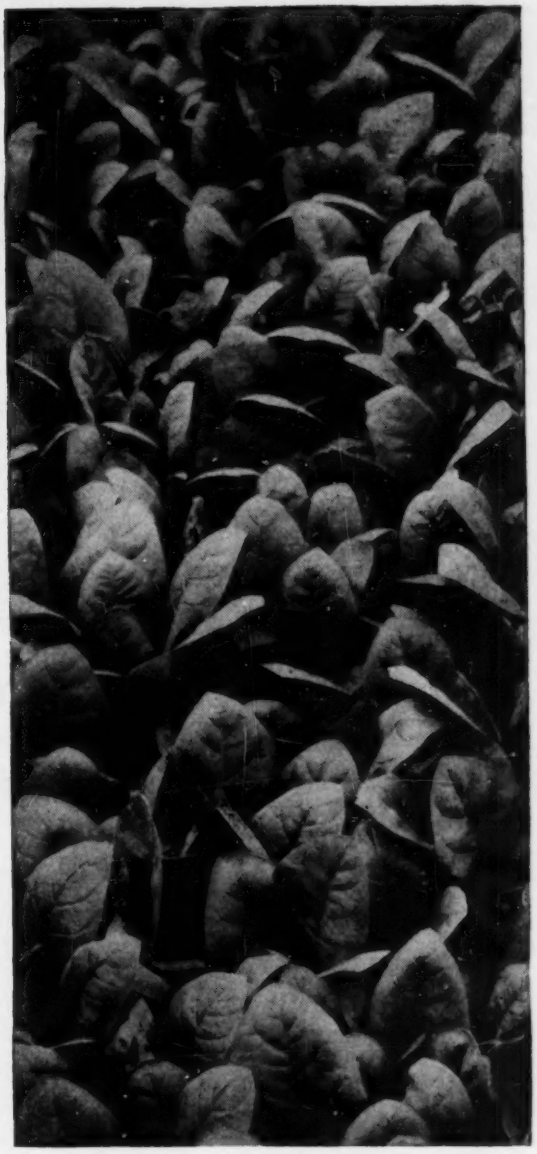
(*Above*) **PRACTICAL DRILLING MUD CONTROL** is successfully accomplished through the use of QUADRAFOS* (sodium tetra phosphate). Its use results in faster drilling, fewer bits, easier and quicker fishing and formation testing, and fewer cases of stuck pipe. QUADRAFOS is a reagent which renders inactive such materials as calcium and magnesium compounds, normally harmful to drilling mud, and controls the strength and rate of gel formation which ordinarily increase on account of dispersion, heat, or salt water. Another chemical tool for controlling the viscosity of drilling mud is AEROFLO**. Added to the mud, it increases the effectiveness of phosphates, especially in salt-cut muds, in muds which do not respond to phosphates, and where high temperatures cause rapid thickening of phosphate-treated mud. Information on the application of QUADRAFOS and AEROFLO to drilling mud problems is available through Cyanamid's Houston, Texas, office.

(*Right*) **WASTE THAT MAKES HASTE** in the production of synthetic rubber and high-octane gasoline is aluminum scrap from industrial plants. This salvaged waste is an important source of anhydrous aluminum chloride, essential catalyst for the synthesis of ethylene and benzene to produce styrene for GR-S, and to convert butane into iso-butane for the manufacture of commercial iso-octane for aviation gasoline.

Chemical Newsfront



(*Above*) **SIX-PLY SINGLE AND DOUBLE MULTI-WALL BAGS** made of asphalt-laminated paper treated with Cyanamid's melamine wet strength resin have been developed by Cyanamid in cooperation with the Bemis Brothers Bag Company to protect contents during outdoor storage and to permit handling while wet. Bags packed with a water soluble chemical remained in perfect condition during a four-months' test under severe weather conditions.



(*Above*) **WEEDLESS TOBACCO PLANT BEDS** are achieved by treating soil with Granular 'AERO' CYANAMID 90 days before seeding time. It first decomposes in the soil to form compounds which kill weed seeds and plant diseases. After this, other compounds are formed which produce an abundance of healthy, vigorous plants.

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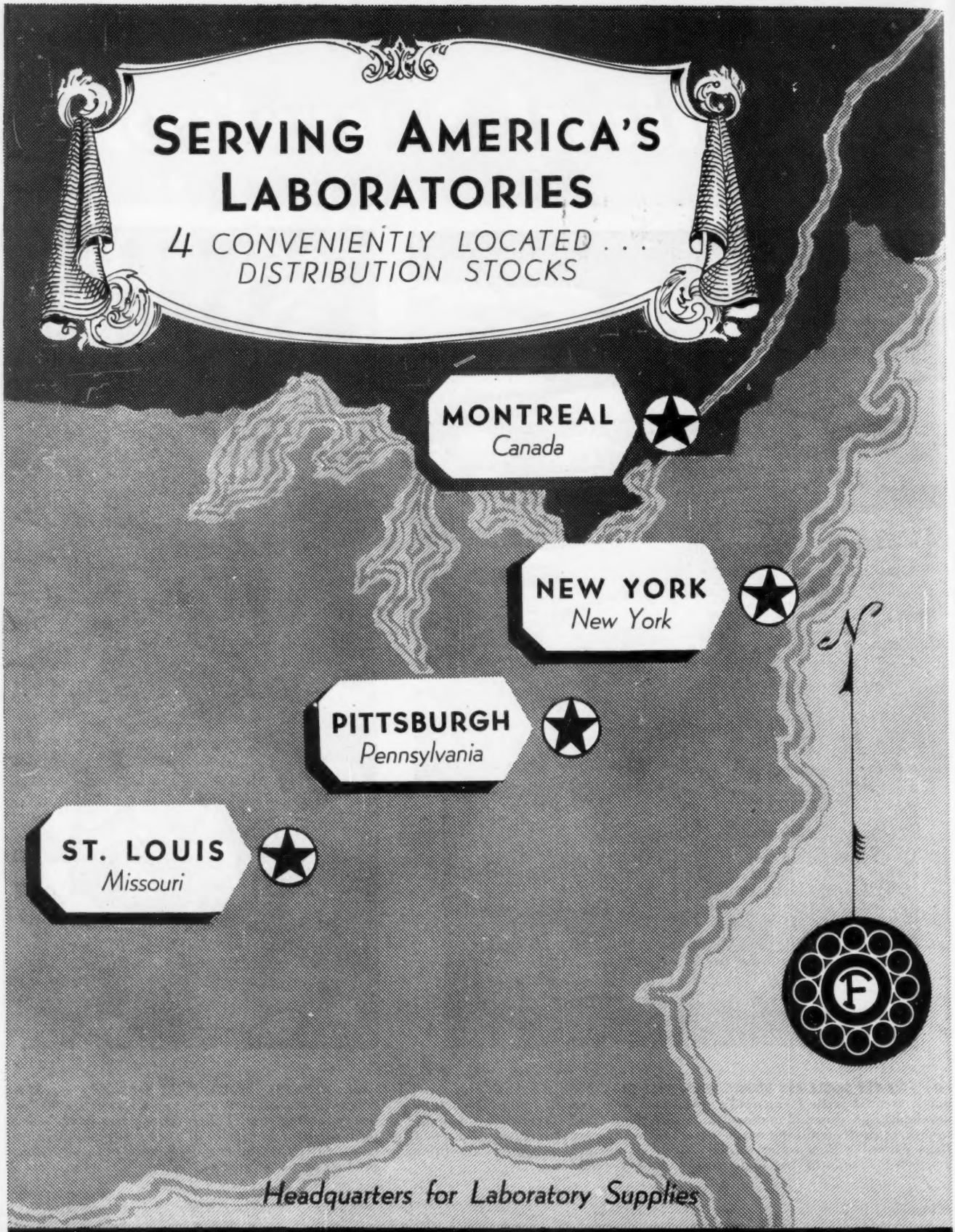

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Today, no people face a New Year with deeper resolve or more fervent hope.

In the dawn of this year, the eyes of America are turned toward distant shores. The prayer of all is that, before the last page of the calendar is turned, "1945" will have been written as history's greatest symbol of glorious victory, joyous homecoming and lasting freedom.

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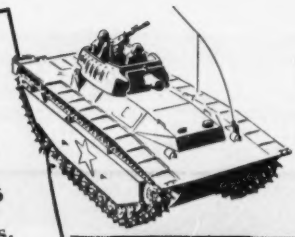
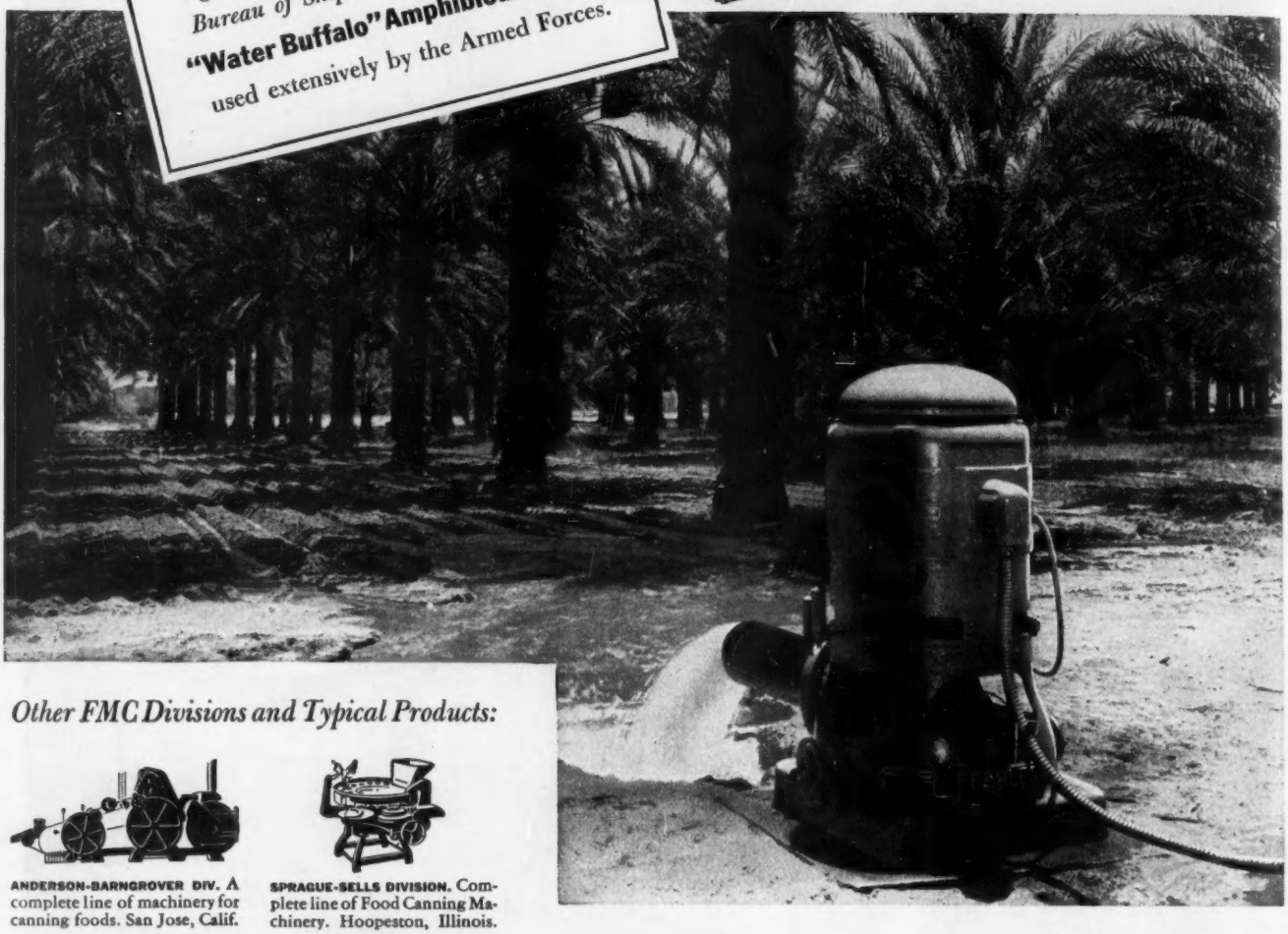


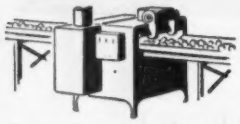
Seven of Food Machinery Corporation's fourteen major factories make "Water Buffalos" or sub-assemblies.



Other FMC Divisions and Typical Products:

ANDERSON-BARNGROVER DIV. A complete line of machinery for canning foods. San Jose, Calif.

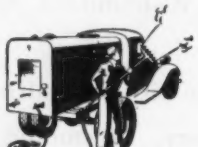
SPRAGUE-SELLS DIVISION. Complete line of Food Canning Machinery. Hoopeston, Illinois.



TEXAS DIVISION... Food Protective Processes, Fruit & Vegetable Packing Equipment, Canning Machinery. Harlingen, Texas.

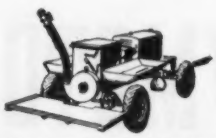
FLORIDA DIVISION... Citrus and Vegetable Packing Equipment, and Food Protective Processes. Dunedin and Lakeland, Florida.

JOHN BEAN MFG. CO. DIVISION. Fog Fire Fighters, Automotive Service Station Equipt., Bean Spray Pumps. Lansing, Mich.



BEAN-CUTLER DIVISION... FMC Fog Fire Fighters, Crop Sprayers and Fruit and Vegetable Packing Equipment. San Jose, Calif.

RIVERSIDE DIVISION. Citrus Packing Equipment, Automatic Box Making & Lidding Machinery, Fruit and Vegetable Protective Processes. Riverside, California.



NIAGARA SPRAYER & CHEMICAL CO., INC. DIV. Insecticides to protect crops from insects, diseases. Middleport, N.Y.; Jacksonville, Fla.; Burlington, Ont., Canada.

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The irrigation pump pours out torrents of cool, clear water from deep underground, and arid wasteland turns green and bears fruit. In great cities and humming factories, batteries of pumps supply hundreds of thousands of gallons of life-giving water every minute. *Wherever water is pumped*—cities, factories, ranches, overseas with our armed forces—Peerless Pumps are known and preferred. Whatever its type—Turbine, Hi-Lift or Hydro-Foil—every Peerless Pump embodies the superb engineering, advanced design and sound construction that is typical of *all* products made by FMC.

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EXECUTIVE OFFICES: SAN JOSE, CALIFORNIA

Peerless Pump factories are located at Los Angeles and Fresno, California; Canton, Ohi

We can all see with the naked eye that the Payroll Savings Plan provides the most stable method of war financing. Analyze it under the X-ray of sound economics and other important advantages are evident.

A continuous check on inflation, the Payroll Savings Plan helps American Industry to build the economic stability upon which future profits depend. Billions of dollars, invested in War Bonds through this greatest of all savings plans, represent a "high level" market for postwar products. Meanwhile, putting over Payroll Savings Plans *together* establishes a friendlier relationship between management and labor.

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The Treasury Department acknowledges with appreciation the publication of this message by

CHEMICAL INDUSTRIES

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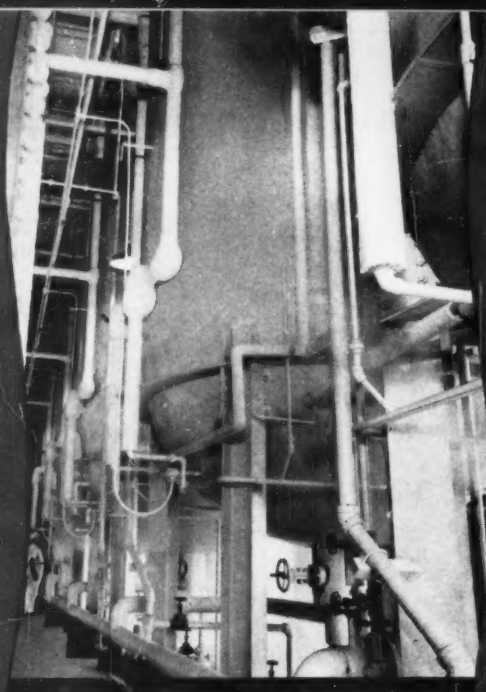
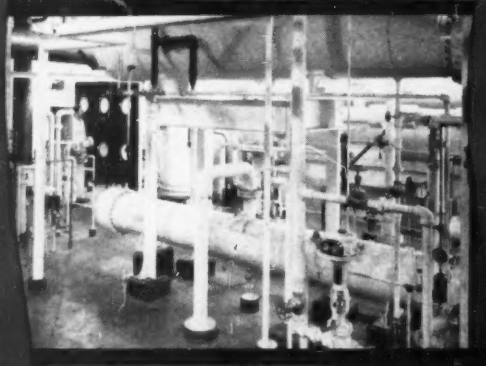
This is an official U.S. Treasury advertisement prepared under the auspices of Treasury Department and War Advertising Council.

CSC PRODUCTS used in

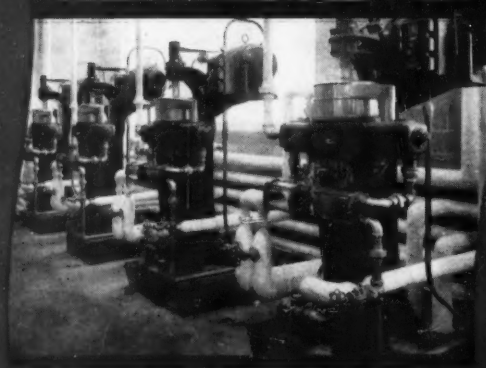
The extent to which Commercial Solvents is able to manufacture economically, in keeping with industry's demands of highest quality at lowest cost, is indicated by the use of these eleven C. S. C. products in the manufacture of Penicillin-C. S. C.



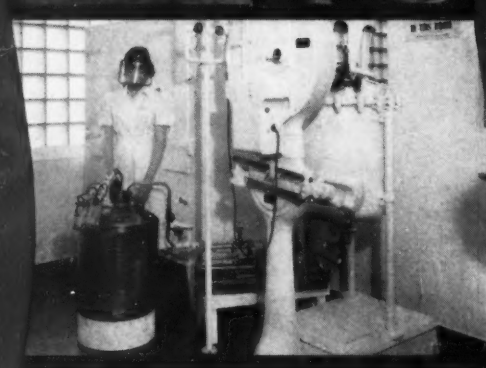
CORN OIL is used in the fermentation process which produces Penicillin-C.S.C. This is one battery of 12,000 gallon fermentation tanks used to grow the mold *Penicillium notatum* by the "deep culture process."



ACETONE, made by Commercial Solvents B•Y fermentation process, is used to extract the carbon-adsorbed penicillin. In these evaporators acetone is separated, leaving a concentrated solution of penicillin.



AMYL ACETATE and a water emulsion of penicillin concentrate are separated in these high-speed, super centrifuges; further chemical treatment produces the sodium or the calcium salt of Penicillin-C.S.C.



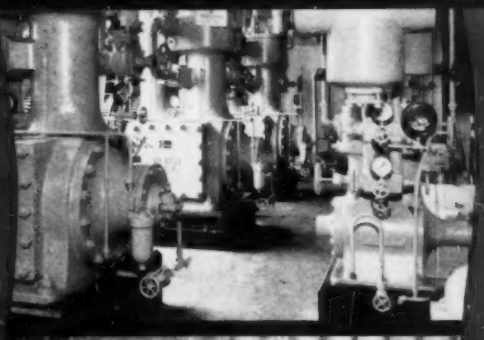
ALKATERGE-O, a surface active agent recently developed by C.S.C., is utilized in the process. The bulk container (before operator) holds all of the penicillin solution recovered from one of the 12,000 gallon fermentation units.

C.S.C. ROSSVILLE ALCOHOL is used throughout the "sterile area" in various types of antiseptic solutions; all persons entering the "sterile area" must go through a "lock," wash with surgical soap, and don sterilized gowns.

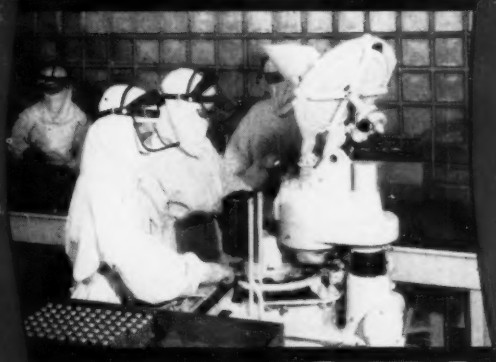
Penicillin-C.S.C. is now shipped by the carload to America's armed forces. Photograph shows the inside of a car.

making PENICILLIN CSC

AMMONIA is another essential item. About 375 tons of ammonia refrigeration are required for cold processing and storage. The penicillin solution must be frozen in the vials and then placed in dehydrators.



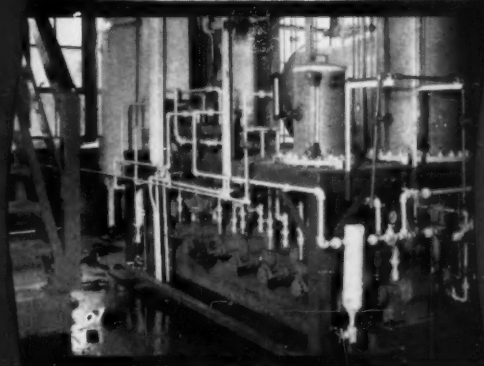
C. S. C. HAND PROTECTOR CREAM is widely used by employees throughout the plant; this protective cream is applied before going to work. In view at right, vials of Penicillin-C. S. C. are being sealed with aluminum closures.



C. S. C. SOLVENTS are used in making the lacquer coating on Penicillin-C. S. C. labels and cartons. As penicillin must be stored under refrigeration, the moisture-resistant lacquer coating keeps the package in perfect condition.

DRY ICE made by C. S. C. from carbon dioxide fermenter gas is utilized for many purposes in the laboratory, especially where cold baths are necessary for various tests. Control laboratory of the C. S. C. Penicillin Plant shown at right.

CRANE THREAD LUBRICANT (a product manufactured by C. S. C. for Crane Co.) was used in making thousands of pipe connections in the plant. The proportioning equipment (right) has a multiplicity of intricate pipe connections.



B-43 RIBOFLAVIN SUPPLEMENT is a valuable ingredient in the nationally known feedstuffs used in the "animal house." Here over 1500 specially bred rabbits are used in tests that make sure Penicillin-C. S. C. is pyrogen-free.

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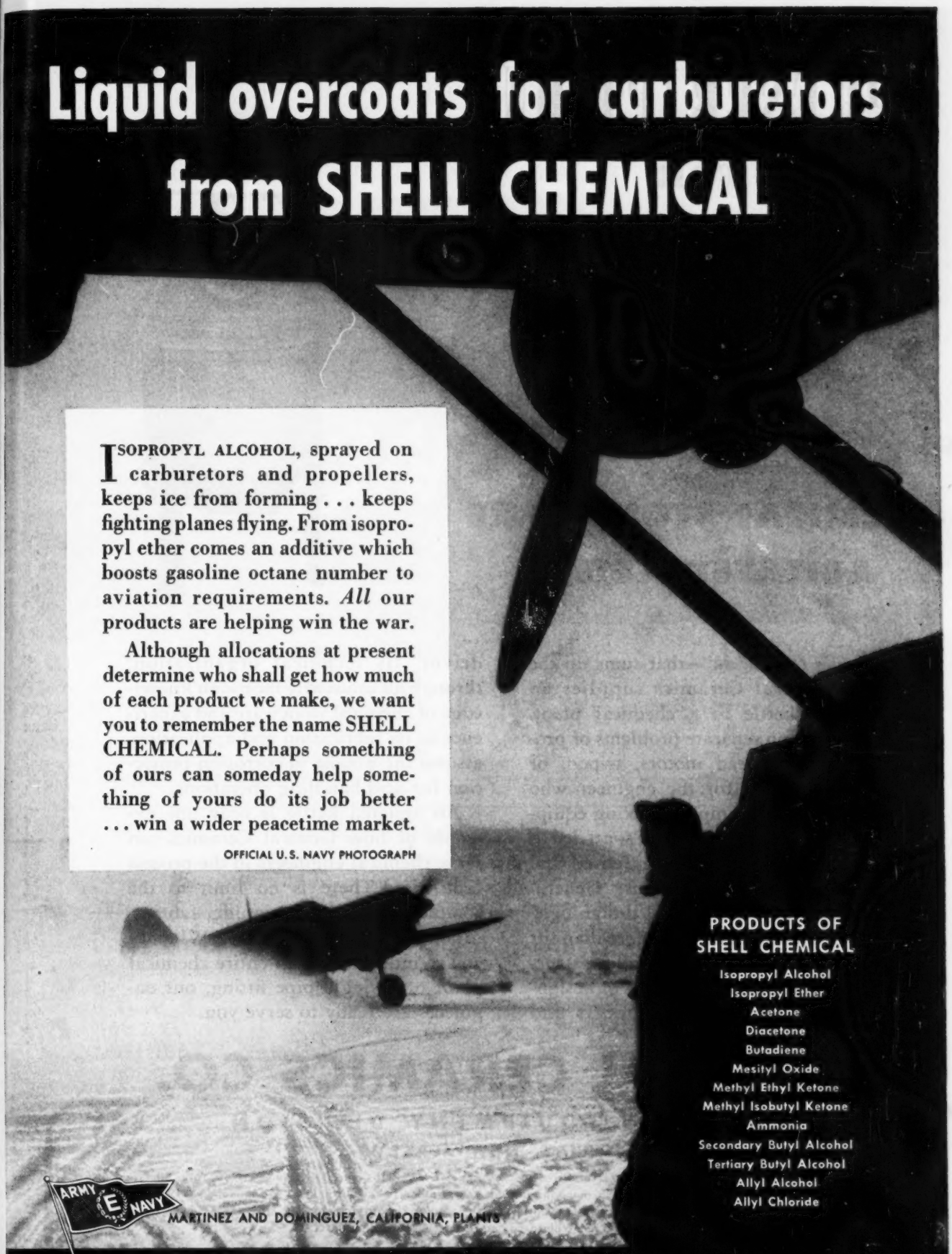
Liquid overcoats for carburetors from SHELL CHEMICAL



ISOPROPYL ALCOHOL, sprayed on carburetors and propellers, keeps ice from forming . . . keeps fighting planes flying. From isopropyl ether comes an additive which boosts gasoline octane number to aviation requirements. *All* our products are helping win the war.

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Methyl Isobutyl Ketone
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Tertiary Butyl Alcohol
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General Ceramics does more than lift from over-worked design and construction departments the burden of designing their own kettle supports and drives. Its technical organization, through an unusually thorough knowledge of chemical stoneware and experience in its fabrication and application, assures the utmost in corrosion protection for acid handling operations.

An agitated kettle is only one example of how General Ceramics can serve chemical engineers in the process industries. There is no limit to the completeness of its designing, fabrication and assembly facilities. Whether you're interested in an entire chemical plant or a single pipe fitting, our engineers are ready to serve you.

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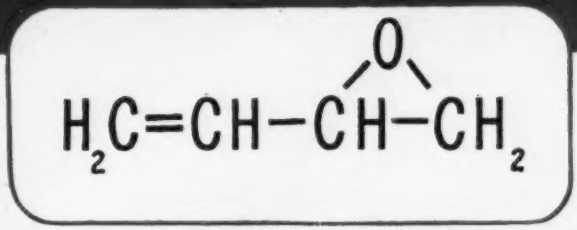
The manufacturing facilities of these affiliates of GENERAL CERAMICS CO. are available for handling ceramic problems in all branches of industry. GENERAL CERAMICS CO. is thus able to offer a service covering all industrial applications of ceramic products.

7192

From
Columbia Research
Laboratories
a New Organic Compound

BUTADIENE MONOXIDE

(3, 4-Epoxy-1-butene) (Vinylethylene Oxide)



The reactions characteristic of these two organic groups render this compound useful in diverse organic processes, such as the production of polymerizable alkyd resins, unsaturated alcohol ethers and esters. They suggest interesting possibilities in a variety of other organic chemical products and pharmaceuticals.

PHYSICAL PROPERTIES OF 3,4-EPOXY-1-BUTENE

Butadiene Monoxide is a colorless, relatively volatile, liquid organic compound possessing both carbon to carbon unsaturation and an alpha-epoxide group having the following physical properties:

Molecular Weight	70.1	Freezing Point	Below −85°C.
Specific Gravity, 25°C./4°C.	0.8693	Flash Point	Below −50°C.
Refractive Index, $n_{20}D$	1.4170	Solubility at 25°C. in	
Boiling Point at 760 mm. of Hg.	66°C.	a. Alcohol, acetone, ether, ethyl acetate, chloroform, benzene, petroleum ether	Miscible
Vapor Pressure		b. Water, % by weight	6
At 0°C.	44 mm. of Hg.	Ethylene glycol, % by weight	22
At 25°C.	144 mm. of Hg.	Odor	Sharp, gasoline-like
Latent Heat of Vaporization, cal. per gram at the normal boiling point	116		

Samples and Technical Data Available . . .

Samples of Butadiene Monoxide are available for experimental purposes and will be furnished on request at no charge. A Technical Bulletin will also be furnished, showing the reactions of 3,4-Epoxy-1-butene with Alcohols, Amines, Inorganic and Organic Acids, Organic Acid Anhydrides, Organic Acid Chlorides, Halogens and Hypohalous Acids.

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Celanese® Chemicals

Celluflex and other Celanese organic phosphates, depending on the requirements, are major plasticizer components of the protective coatings on the wiring systems of naval craft. Celluflex contributes characteristics of flame resistance, moisture resistance, lightness, toughness and flexibility to the intricate maze of electrical cables.

CELANESE CORPORATION OF AMERICA

Practical research goes beyond actual application . . .

FOR ITS PRODUCTION of organic chemicals, Celanese is now drawing on additional sources of raw material supply. This has been made possible by the development of new and original processes for the manufacture of organic phosphates from petroleum base products.

Celluflex*, the newest member of the Celanese family of organic phosphates, is characterized by lower specific gravity, higher viscosity and boiling point, and lower solvent power. Celluflex is used in higher percentage for plasticizing resin and cellulosic films than was feasible with other cresyl phosphates. Its lower solvency permits the incorporation of higher plasticizer content, thus Celluflex increases the tensile strength of film, eliminates tackiness, reduces film flammability and has no tendency to exude. The lower surface tension and higher viscosity of Celluflex contributes to its pigment dispersion ability, solving problems of that nature.

Like all the other Celanese organic phosphates, Celluflex is stable, odorless, non-flammable, non-oxidizing, non-volatile, and non-corrosive. It is valuable as a lubricant and as a lubricant additive for many vital applications from aviation motor oils to lubricants for delicate instruments. Complete miscibility of all these compounds with one another permits a wide range of adjustment or combination of properties to make these materials even more adaptable.

Great things are expected of synthetics, and ever greater demands will be made of the industry producing and fabricating them. As difficulties come up, you will find our research staff eager to make your problem their problem, and to assist in achieving your objective. Celanese Chemical Corporation, *a division of Celanese Corporation of America*, 180 Madison Avenue, New York 16, N. Y. *Reg. U. S. Pat. Off.

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LUBRICANT ADDITIVES

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Sampling and Analysis of Anhydrous Hydrogen Fluoride

new

accurate and safe

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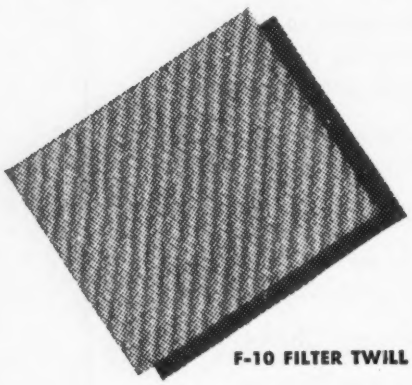
■ FOR THE CHEMICAL INDUSTRY ■

Long experience with filter fabrics enables us to meet the individual needs of processing operations carried out under widely varied conditions. Where a standard fabric does not meet a particular requirement, we frequently are able to develop a special construction. Our laboratories are always available for consultation with chemical engineers and manufacturers.



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COTTON FILTER FABRICS

The eighteen mills we represent maintain such close laboratory control that a consistent uniformity of each individual product can be relied upon.

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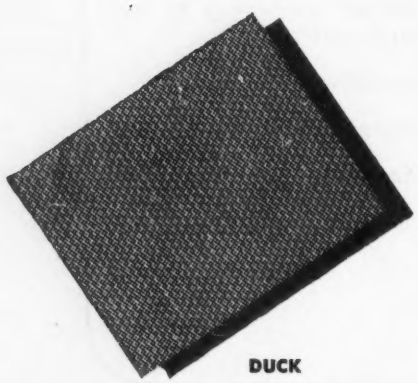
VIN-28 CHAIN CLOTH

Filter fabrics of this synthetic fiber are highly resistant to mineral acids and alkalies, and therefore offer important advantages where ordinary filter blankets are short-lived. Due to the fact that "Vinyon" fibers have definite heat limitations, we suggest that our engineers be given an opportunity to discuss their application to your particular filtration process.

* Reg. Trade Mark C. & C. C. C.



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To plastics manufacturers we offer a variety of fabrics for test and experiment. We are glad to work now with plastic manufacturers who are planning the post-war development of new products and materials.

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We have a highly specialized laboratory for the study of catalysts and catalytic reactions. We will be glad to help you adapt Isocel to your own processes, or to assist you in developing new catalytic materials of this general type.

We have specialized in the development of bauxite both as a catalyst and as a catalyst carrier. In developing Isocel, we have also studied applications of bauxite as a carrier for many other catalytic materials. Before figuring the costs of a new catalyst or reagent using adsorbent materials, let us tell you how economically we can make it.

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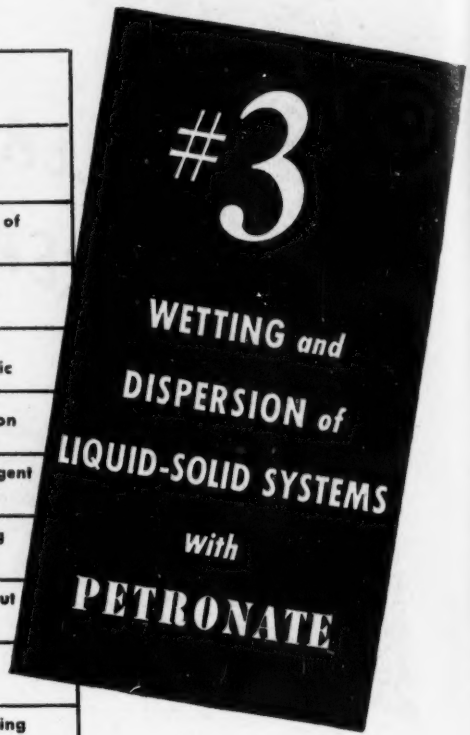
One of the FOUR Major Properties of

PETRONATE

(OIL-SOLUBLE PETROLEUM SULFONATE)

★ **EXAMPLES** ★

USE	PRIMARY FUNCTION OF PETRONATE	SECONDARY FUNCTION
*Leather Processing	Emulsifying Agent	Increases Softness of Leather
Metal Drawing Compounds	Dispersing Agent for Filler	Acts as Detergent
Dry Cleaning Compounds	Linking Agent for Water and Solvent	Loosens Dirt Absorbed by Fabric
*Paint and Varnish Removers	Aids in Cutting Paint Film	Retards Evaporation
Soldering Pastes	Homogenizing Agent for Flux Ingredients	Acts as Wetting Agent for Metal Surfaces
*Synthetic Rubber Manufacture	Emulsifying Agent for Co-polymers	Acts as Dispersing Agent for Filler
Crude Oil Emulsion Splitting	Reverting Agent for Water-in-Oil Emulsions	Aids in Wetting Out Salts and Solids
*Paper Processing	Wetting Agent for Pulp	Aids Sizing
Cordage Oils	Scouring Agent	Improves Lubricating Characteristics
Machine and Floor Cleaners	Solubilizing Agent for Oil and Grease Deposits	Acts as Emulsifying Agent



*Subject to further development.

How Petronate may be adapted to one or more of your manufacturing processes, present or contemplated, is suggested by the typical functions of this highly purified oil-soluble petroleum sulfonate (mahogany soap) listed above.

Petronate has won widespread acceptance as an important basic material for many industrial applications related to its four major functional properties:

1. **Emulsification and Dispersion of Liquids.**
2. **Dispersion and Wetting of Solids.**
3. **Wetting and Dispersion of Liquid-Solid Systems.**
4. **Inhibition of Rust and Corrosion.**

As indicated, Petronate lends itself to a great variety of uses—actual and potential. Its functions in the first and second of these logical fields were covered in earlier examples (*reprints on request*). The fourth group will be presented in the next issue of this series.

Meanwhile, the opportunity to study specific problems with you will be welcomed, and a sample of Petronate for laboratory experimentation will be supplied promptly upon request.

NOTE.— By reason of its present use in the manufacture of war-important products, PETRONATE is available only on allocation. However, ample postwar supplies are anticipated.

WHITE OIL DIVISION

L. SONNEBORN SONS, INC.

Refiners of Petroleum

88 LEXINGTON AVENUE • NEW YORK 16, N. Y.

Typical Analysis of PETRONATE	
Sulfonates	62%
Mineral Oil	35%
Inorganic Salts	none
Water	3%
	100%

Double duty for RAYON!

Chemical exactness makes it possible

Giant colored parachutes drop their supplies of food, medicine, water and ammunition to waiting soldiers—

And thus rayon serves on both the war and the home front!

It is rayon fabric there in the floating canopies—a rayon stronger and tougher than that used for ordinary fabrics—a rayon specially engineered to withstand the sudden shock of the load as the parachute snaps open.

In the development and production of war-time rayon, Baker has played, and is playing, a part. Baker supplies uniform chemicals for processing, and to exacting specifications.

This is only one of many instances where Baker Chemicals are contributing to our nation's war effort.

Baker's Chemicals have been supplied to many manufacturing concerns for the manufacture or processing of various products.

If you have special chemical requirements involving purity to the decimal for war-production products, or for the anticipated post-war reconversion program, we invite you to discuss your needs in confidence with Baker.

J. T. Baker Chemical Co., ***Executive Offices and Plant:*** **Phillipsburg, N. J.** ***Branch Offices:*** **New York, Philadelphia and Chicago.**

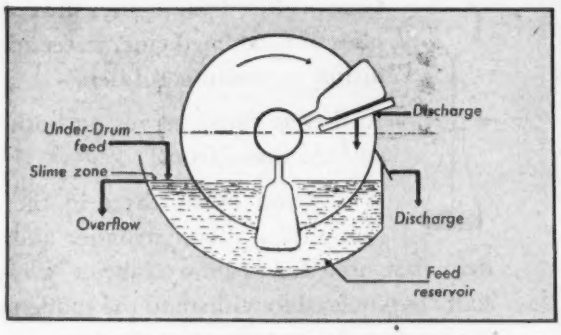
Baker's Chemicals

C. P. ANALYZED • FINE • INDUSTRIAL

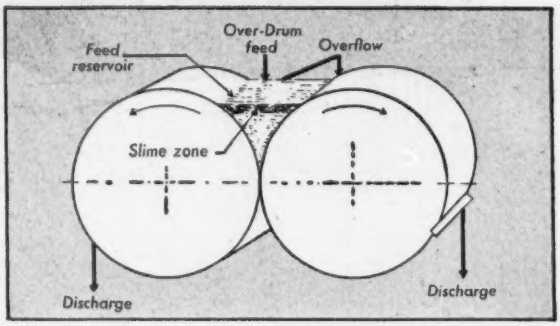
GENERAL AMERICAN IS

YES, General American is *headquarters* for Process Equipment—offers a line of proven, modern equipment covering nearly every need. But today General American is proud to announce still another addition to its "family"—a line of machines about which you have undoubtedly heard. . . .

PETERSON FILTERS



Showing why the slime zone present in reservoirs containing the feed tend to blind media of disc and drum filters.



The Syncro-Drum Filter, showing how filter medium encounters the coarse particles before the slime, thereby minimizing the blinding effect.

PETERSON Syncro-Drum Filters are continuous rotary vacuum filters which offer new performance standards by virtue of two synchronized drums rotating in opposite directions with cheek-plate dams to provide an "over-drum" feed reservoir or tank entirely above the horizontal center line of the filtering surface.

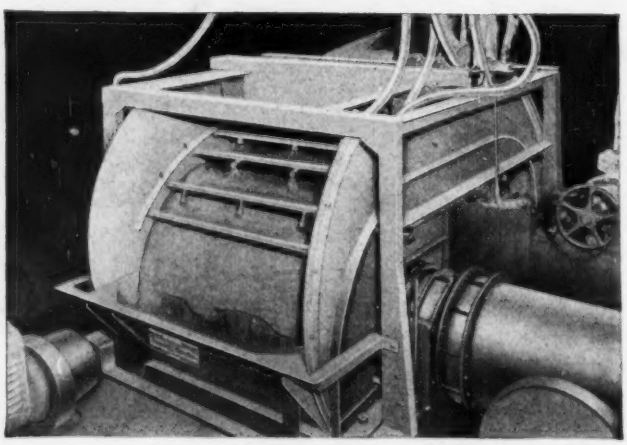
This "over-drum" reservoir or tank makes possible one unit operation for handling coarse, fast-settling products which contain a percentage of slimes which heretofore have required classification before filtration.

Peterson Syncro-Drum Filters are applicable in many chemical and metallurgical processes where material containing 20% to 70% solids breaks into sizes from substantial percentage minus 200 mesh to 3 mesh or are subject to rapid settling.

Operation is simple and continuous. Surges in feed to the filter are easily handled by a simple gate type overflow on the reservoir. The coarse preformed particles form a cake through which the slimes do not penetrate, greatly reducing plugging of the filter medium. Long-time, dependable operation without replacement of filter medium is assured through the new type of "depth filter" elements. The "depth filter" elements may be replaced in individual sections.

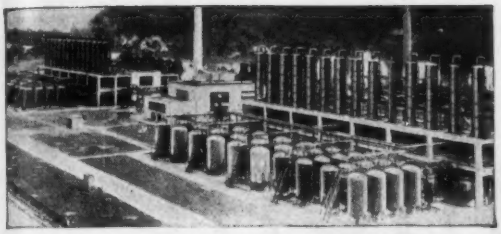
Unusually high capacities can be obtained since plugging has been minimized and thin filter media eliminated. Optimum gravity effect is used in cake formation and subsequent discharge is at such a point that very thick formations can be handled, giving a capacity in some cases as high as 4 to 7½ tons per square foot per twenty-four hours.

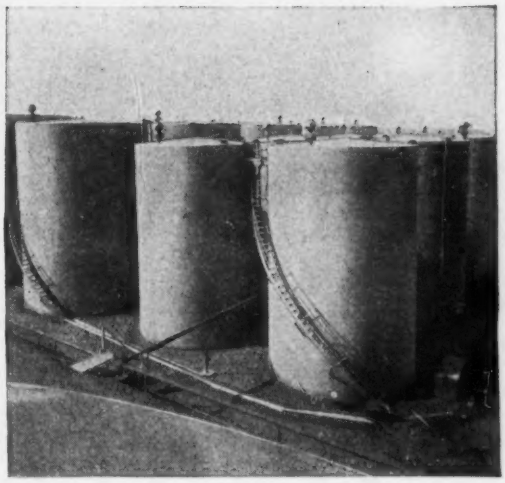
Economies in time, increased output and lowered process costs result from the ability to handle many materials through this advancement in filtration technique.

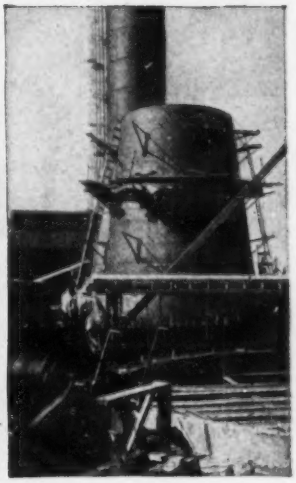


Peterson Syncro-Drum Filter installation.

EQUIPMENT HEADQUARTERS!







DRYERS, MIXERS, EVAPORATORS and PLATE FABRICATION (EITHER WELDED OR RIVETED)

The General American line includes also the famous Louisville Rotary Dryers, Coolers, Dewaterers — Conkey Filters and Evaporators — Turbo-Mixers, Agitators and Aerators — American Drum Dryers — all the multitude of plate fabricated equipment manufactured by the Plate & Welding Division, Sharon, Pa.

The Plate & Welding Division has complete facilities to build a very wide variety of equipment, in carbon, stainless and alloy steels, Everdur, aluminum and other special alloys — accumulators, crystallizers, dissolvers, heat exchangers, filters, condensers, kilns, digesters, tanks and others too numerous to mention. It is equipped with X-ray facilities, heat-treating and stress relieving furnaces — therefore in position to build all classes of welded vessels to the API-ASME, ASME and other codes. . . . It also maintains a large field erection department, and complete chemical and physical testing laboratory.

WRITE for all the FACTS!

In addition to its excellent production facilities, General American offers you a unique combination of research and engineering skills. Its Research and Development Laboratories at Sharon and Louisville are models for the industry. We would be glad to send you full information about any of our products — our research and development facilities — our ability to serve you well. Correspondence with engineering firms is especially invited. *Address:*

GENERAL AMERICAN
TRANSPORTATION CORPORATION

PLATE & WELDING DIVISION
PROCESS EQUIPMENT DIVISION

GATX GENERAL AMERICAN

General Sales Offices: 420 Lexington Avenue, New York 17, N. Y.

Works: Sharon, Pa., and Louisville, Ky.

Sales Offices: Louisville, Chicago, Sharon, Cleveland, Pittsburgh, St. Louis, Salt Lake City, San Francisco, Tampa, Washington, D. C.

An Enameling Improvement ready *now!*

THE Titanium Alloy Manufacturing Company announces a new titanium alloy enameling steel which offers improved quality and reduced cost to the manufacturers of vitreous enameled products.

This new steel has exceptional ductility, being in this respect at least equal to the best deep drawing steels previously known. It also has superior resistance to sagging at enameling temperatures.

Tests conducted in many different laboratories have indicated that the use of titanium alloy enameling steel virtually eliminates primary boiling because of the fact that the carbon in the steel has been stabilized by the titanium. This indicates that ground coat can be eliminated, assuring greater uniformity of finished product and reducing rejects and re-operations very substantially. It permits furthermore the application of lighter coats of enamel with the consequent reduction in cost and improvement in appearance and wearing qualities of many enameled articles.

There are many additional features of interest to both steel producers and manufacturers of enameled products.

A member of our Technical Staff will be glad to go over details with you at your convenience. Send us a card for prompt action.

★ ★ ★

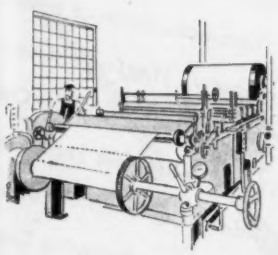
Pending patent applications on the new enameling process and product made thereby are owned jointly by Inland Steel Company and The Titanium Alloy Manufacturing Company under Trust Agreement.

THE TITANIUM ALLOY MANUFACTURING COMPANY

Executive Offices: 111 Broadway, New York, N. Y. *General Offices and Works:* Niagara Falls, N. Y.

A New Cellulose Derivative

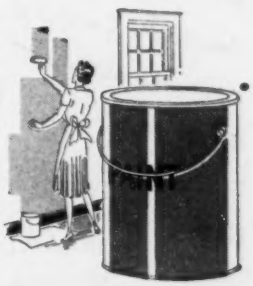
for



TEXTILE SIZES

OIL-RESISTANT PACKAGING

PAPER TOWELING



EMULSIONS

"CELLOSIZE" HYDROXYETHYL CELLULOSE WS

. . . an aqueous solution containing 10 per cent hydroxyethyl cellulose. On drying, it produces a clear, transparent film, of greater strength and clarity than is obtained from commercial methyl cellulose solutions. This film is soluble in hot or cold water, but is completely resistant to the liquid and vapor phases of lubricating oil, ethylene dichloride, and other hydrophobic solvents.

Hydroxyethyl cellulose is of interest for textile finishing, paper sizing, and in shoe and leather dressings where thickening agents such as starches, gums, gelatins, and soluble resins are used. In dyestuff pastes, it tends to increase the solubility of the dyestuff in the printing vehicle. Unlike starch and gelatin sizes it will not mold, and its films do not build up an electrostatic charge.

Combined with glyoxal, hydroxyethyl cellulose becomes water-resistant. Such a film, being insoluble in oils, greases, and organic solvents, should be useful in vapor- and liquid-proof packages. When paper toweling is impregnated with small amounts of hydroxyethyl cellulose and glyoxal its wet strength is greatly increased.

"Cellosize" Hydroxyethyl Cellulose WS is a good protective colloid for dispersion of oil, fats, waxes, and pigments, and should be useful in emulsion polymerization, emulsion varnishes, and water paints. It has adhesive properties.

A 10 per cent aqueous solution of "Cellosize" Hydroxyethyl Cellulose WS can be supplied in limited commercial quantities. Also available are research quantities in the form of a dry powder.

For further information write for our technical data sheet.

SYNTHETIC ORGANIC CHEMICALS

Carbide and Carbon Chemicals Corporation

Unit of Union Carbide and Carbon Corporation

UCC

30 East 42nd Street, New York 17, N. Y.

"Cellosize" is a registered trade-mark of Carbide and Carbon Chemicals Corporation.

Ansco Company
E. I. du Pont de Nemours Company
Corning Glass Works
Dow Chemical Company
State of Nebraska
Allied Chemical & Dye
Talco Asphalt & Refining Company
B. F. Goodrich Compa
Atlantic Coast Fisheries
J. T. Baker Chemical C
E. R. Squibb & Sons
American Steel & Wire C
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Potash Company of Ame
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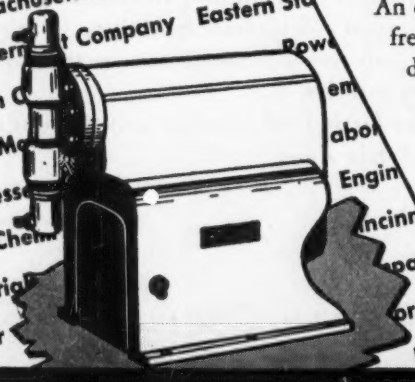
IF YOUR NAME ISN'T HERE...

Why?

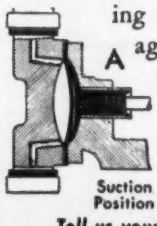
WHEN you check through the list of long-time, thoroughly satisfied users, it can't be that you think your business is so "different" that WILSON *Pulsafeeders* will not handle your chemical proportioning and metered flows of liquids, with equal satisfaction and economy.

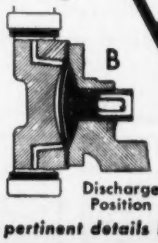
Our guess is that we haven't had opportunity to present the facts. May we have that opportunity *now* in person or by mail? If you have a problem that WILSON *Pulsafeeders* will solve, or a process in which they will serve with greater accuracy, dependability and economy, we'll both be losers until these amazing proportioning pumps go to work in your plant.

Accuracy of Wilson Pulsafeeders is guaranteed in most instances at better than ⅛ of 1%. Capacity ranges from 1 cph. to 600 gph. Almost any power source suffices. Control may be manual or automatic (at unit or remote), flow may be mono or multiple. They serve magnificently in chemical proportioning, food and other processing, in laboratories, water and sewage treatment, etc. They are so flexible, they are adaptable to almost any purpose and our Engineering Service is experienced, cooperative and competent.



An outstanding superiority of WILSON *Pulsafeeders* is their freedom from leak-likely packing glands and breakable diaphragms. Sketches "A" and "B" show isolation of load liquids from working parts and the scheme of shape-changing of the flexible diaphragm against inert liquid as the piston advances. Possibility of rupture is obviated.





Tell us your requirements and we will send pertinent details NOW.

K-13

WILSON CHEMICAL FEEDERS, Inc.

215 CLINTON STREET (P. O. Box 998) BUFFALO 4, N. Y.

Est. 1923 . . WITH EXPERIENCE IN ALLIED LINES SINCE 1914

SHARPLES DIETHYLAMINE

SHARPLES TRADE MARK CHEMICALS

SPECIFICATIONS

Color	Water White
Sp. Gr. at 20/20° C.	0.71
Amine Content—not below	98% as Diethyl
Water Insoluble	None
Distillation:	
Initial boiling point	53.0° C.
Final boiling point	59.5° C.

PROPERTIES

Theor. Molecular Wt.	73.14
Average Wt. at 20° C.	5.9 lbs./gal.
Flash Point (open cup)	Below 0° F.
Melting point	Approx. –50° C.
Solubility in:	
Water	Soluble
Methanol	Soluble
Ether	Soluble
Benzene	Soluble

Diethylamine undergoes typical reactions with aldehydes, ketones, oxides, phosgene, carbon bisulfide, chlorohydrins, cyanates and thiocyanates.

APPLICATIONS

As an intermediate or raw material, present and potential uses of Diethylamine include the following:

1. Manufacture of vulcanization accelerators for both natural and synthetic rubbers.
2. Synthesis of several pharmaceutical products.
3. Synthesis of certain dyestuffs.
4. Manufacture of parasiticides.

In addition to applications as an intermediate for various organic syntheses, Diethylamine has been used to catalyze certain reactions—particularly alkaline condensations.

AVAILABILITY

Diethylamine can be supplied promptly in quantities up to and including tank cars. Include Diethylamine for evaluation in connection with your present and postwar plans. Samples will be submitted promptly upon receipt of your request on company letterhead.

ARMY E NAVY

Sharples Chemicals Inc. PHILADELPHIA · CHICAGO · NEW YORK

SHARPLES SYNTHETIC ORGANIC CHEMICALS

PENTASOL (AMYL ALCOHOLS)
PENT-ACETATE (AMYL ACETATE)
PENTALARM (AMYL MERCAPTAN)
BURAMINE (CRUDE BUTYL UREA)
PENTAPHEN (p-tert-AMYL PHENOL)
o-AMYL PHENOL DIAMYL PHENOL
DIAMYLPHENOXY ETHANOL

MONOAMYLAMINE	DIAMYLAMINE	TRIAMYLAMINE
MONOBUTYLAMINE	DIBUTYLAMINE	TRIBUTYLAMINE
MONOETHYLAMINE	DIETHYLAMINE	TRIETHYLAMINE

DIETHYLAMINOETHANOL
ETHYL MONOETHANOLAMINE ETHYL DIETHANOLAMINE
MIXED ETHYL ETHANOLAMINES
DIBUTYLAMINOETHANOL
BUTYL MONOETHANOLAMINE BUTYL DIETHANOLAMINE
MIXED BUTYL ETHANOLAMINES
MIXED AMYL CHLORIDES DICHLOROPENTANES
AMYL NAPHTHALENES MIXED AMYLENES

SHARPLES CHEMICALS INC.

EXECUTIVE OFFICES: PHILADELPHIA, PA.
PLANT: WYANDOTTE, MICH.

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New York Chicago Salt Lake City
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Salicylates

SODIUM SALICYLATE, U. S. P.

METHYL SALICYLATE, U. S. P.

ACETYLSALICYLIC ACID, U. S. P.
(Crystals and Powder)

ACETYLSALICYLIC ACID
(10 - 16 - 20% Starch Granulations)

SALICYLIC ACID, U. S. P.
(Crystals and Powder)

AMMONIUM SALICYLATE, N. F.
(Crystals)

CALCIUM SALICYLATE
(Powder)

LITHIUM SALICYLATE, N. F.
(Powder)

MAGNESIUM SALICYLATE
(Powder)

SALOL, U. S. P. - Phenyl Salicylate
(Granular)

STRONTIUM SALICYLATE, N. F.
(Powder)

Produced and controlled in modern plants by expert personnel, HEYDEN Salicylic Acid and Salicylates are accepted as standards of excellence for use in pharmaceuticals, dyes and other products.

The high purity and uniform strength of chemicals by HEYDEN assures manufacturers of consistent yields and high quality finished products.

Qualified technical personnel are available to help you with information on the use and handling of HEYDEN Chemicals.

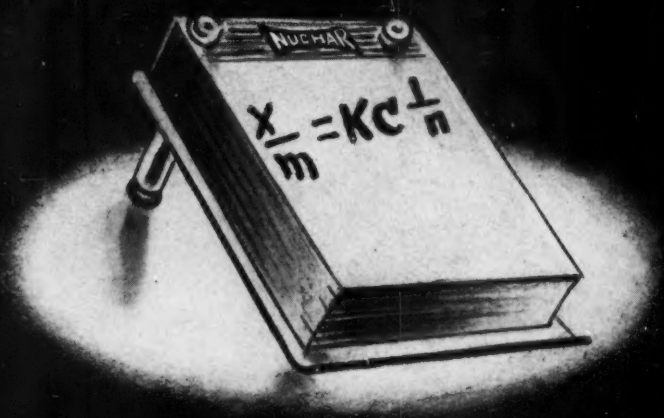
DEPENDABLE FINE CHEMICALS

Write for our current products list.

HEYDEN *Chemical Corporation*

393 SEVENTH AVE., NEW YORK 1 • 180 N. Wacker Drive, Chicago 6

Benzaldehyde • Benzoates • Benzoic Acid • Benzyl Chloride • Bromides • Chlorinated Aromatics • Medicinal Creosotes • Formates • Formaldehyde • Formic Acid
Glycerophosphates • Medicinal Guaiacols • Hexamethylenetetramine • Paraformaldehyde • Para-Hydroxybenzoates • Penicillin • Pentaerythritols • Salicylates



What does this equation mean to you?

This equation is known as the Freundlich equation and is used by physical chemists in problems of adsorption. To the scientist, this equation expresses the relation that is found between the concentration of the impurities on the activated carbon as compared with the concentration remaining in the solution.

But don't let this confuse you. As applied to activated carbon, the average practical man realizes that activated carbon is used to remove impurities from solution. These impurities may represent colors, odors or other intangible impurities.

Nuchar Activated Carbon offers a simple means of replacing the older purification methods with the assurance of successful elimination. Adsorption by carbons of the impurities means their removal and because of the great progress made in the direction of increasing the adsorptive power per unit of carbon, Activated Carbon has shown marked monetary savings over other purification processes. In addition, in many instances, it has been possible to purify many liquids and solutions that did not respond to other methods of treatment.

To the chemist, the Freundlich equation means the removal of off-colors, tastes and odors and to the chemical process industries, Nuchar Activated Carbon means the most effective way to purify . . . by *ad*sorption.

Nuchar Active Carbons
Abietic Acid
Snow Top Precipitated Calcium Carbonate
Liquid Caustic Soda
Chlorine
Lignin
Liqro Crude Tall Oil
Indusoil Distilled Tall Oil
Tall Oil Pitch
Sulphate Wood Turpentine

NUCHAR

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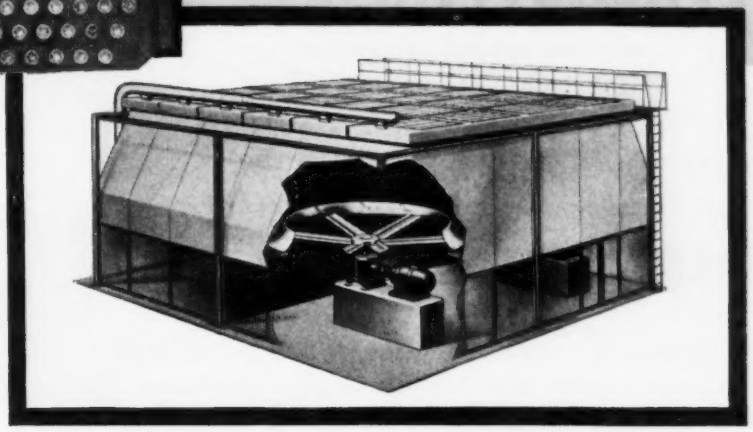
844 LEADER BLDG., CLEVELAND 14, OHIO

K-FIN AIR-COOLED SECTIONS

are incorporated in the FIN-FAN HEAT EXCHANGER



Portion of K-Fin tubing. This finned tubing has also proven its effectiveness and durability in shell-and-tube type vapor condensers involving cooling of non-condensibles, gas-to-liquid heat exchangers including steam generating elements, and reboilers.

In the Fin-Fan Heat Exchanger, a joint development of The Fluor Corp., Ltd. and The Griscom-Russell Co., fluid cooling and condensing services are accomplished by G-R K-FIN SECTIONS utilizing Fan-circulated atmospheric air as the coolant. This represents the most recent application of G-R K-FIN ELEMENTS, the patented Helically-Finned Tube developed over fifteen years ago, and used in many thousands of units for heating and cooling air and other gases.

Note the provision in the headers for accessibility to the tube interiors plus the fully demountable supports employed, both distinctive features permitting internal cleaning and replacement of individual elements.

Write for complete information on these standard, interchangeable condensing and cooling sections, and on the Fin-Fan Heat Exchanger.

THE GRISCOM-RUSSELL CO.

285 Madison Avenue New York 17, N. Y.

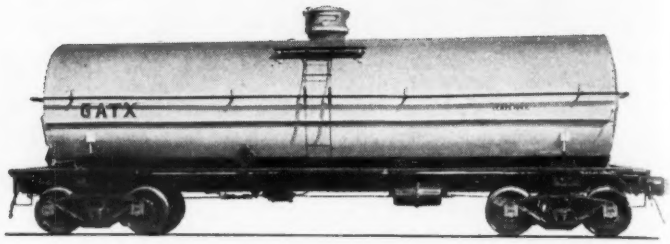
GRISCOM-RUSSELL

Pioneers in Heat Transfer Apparatus

To Make Synthetic Rubber...

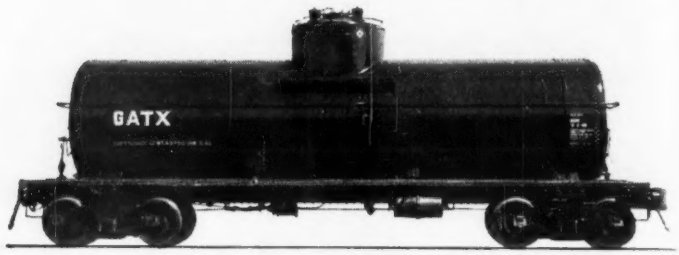
BUTADIENE...

must be carried at high pressure



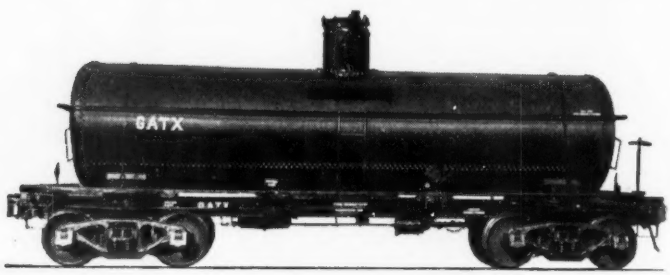
STYRENE...

requires special protection



SULPHURIC ACID...

is hard to handle



For Your Postwar Products

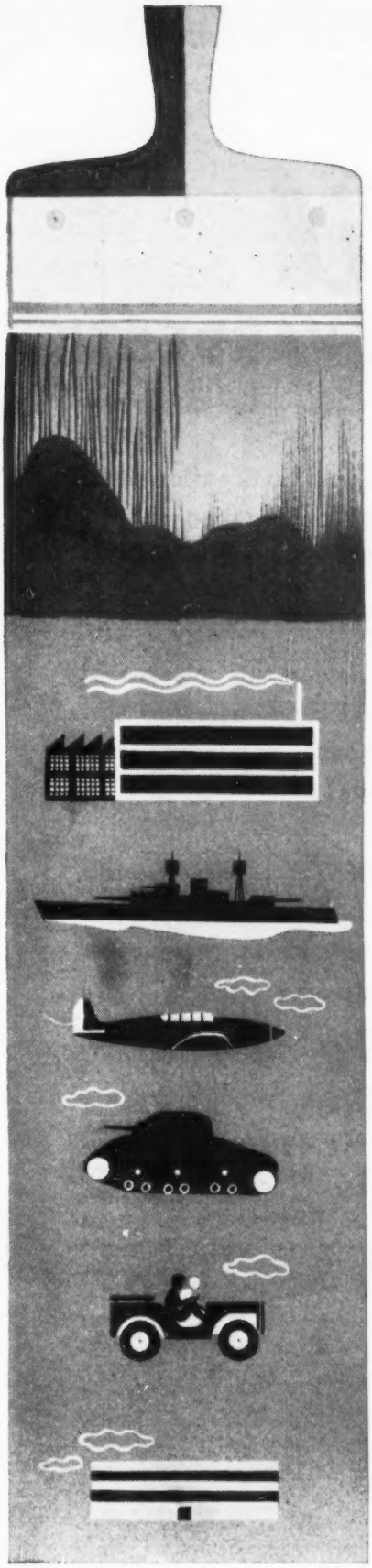
General American engineers are ready now to consult with you—to plan new tank cars with every feature needed to transport your products safely. Call or write our general offices — 135 South LaSalle St., Chicago 90, Ill.

GATX GENERAL AMERICAN

There are General American tank cars with the correct protective features for each component of synthetic rubber. GATX cars are giving safe and sure transportation—to help in reaching the high goals of the synthetic rubber industry.

GENERAL AMERICAN TRANSPORTATION CORPORATION

Builders and Operators of Specialized Railroad Freight Cars ★ Bulk Liquid Storage Terminals ★ Pressure Vessels and other Welded Equipment ★ Aerocoach Motor Coaches ★ Process Equipment of all kinds ★ Fruit and Vegetable Precooling Service



the RCI policy of constant improvement creates even better BECKOSOLS

The never-ceasing search for perfection at RCI now brings formulators a far-reaching result. Thanks to refinements in manufacturing procedure and control technique, the renowned Beckosol line is now *better than ever.*

Today these alkyd resins—bases of the finer industrial and architectural surface coatings—are definitely improved in drying speed, water resistance, initial gloss, and gloss retention. They are ready *now* to give you the properties you expected to get postwar!

Watch America's largest producer of surface-coating resins for further reports of progress. Research at RCI is forging ahead on all fronts.

REICHHOLD CHEMICALS, INC.

General Offices and Main Plant, Detroit 20, Michigan

Other Plants: Brooklyn, New York • Elizabeth, New Jersey • South San Francisco, California • Tuscaloosa, Alabama • Liverpool, England • Sydney, Australia

SYNTHETIC RESINS • CHEMICAL COLORS • INDUSTRIAL PLASTICS • INDUSTRIAL CHEMICALS

you can depend on

Red Oil

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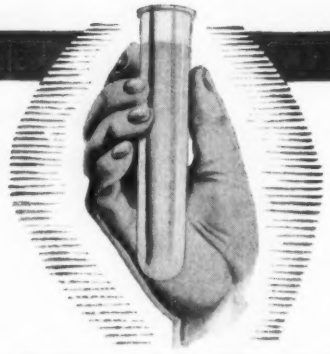

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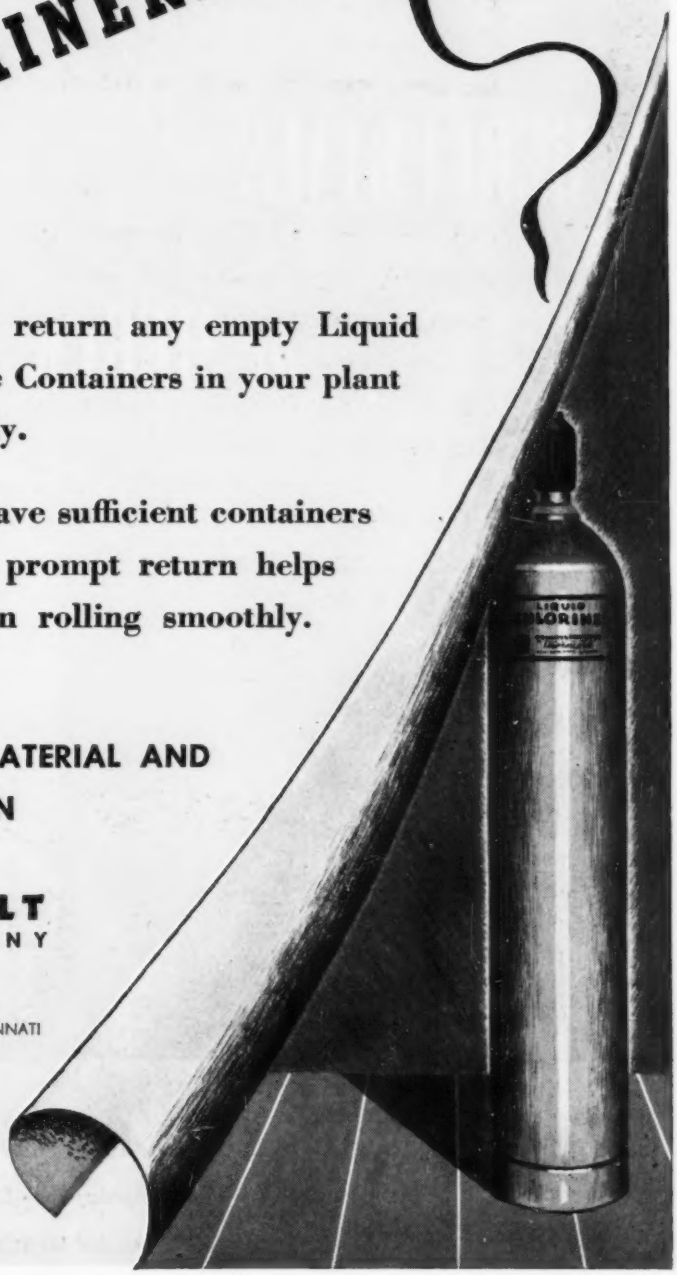

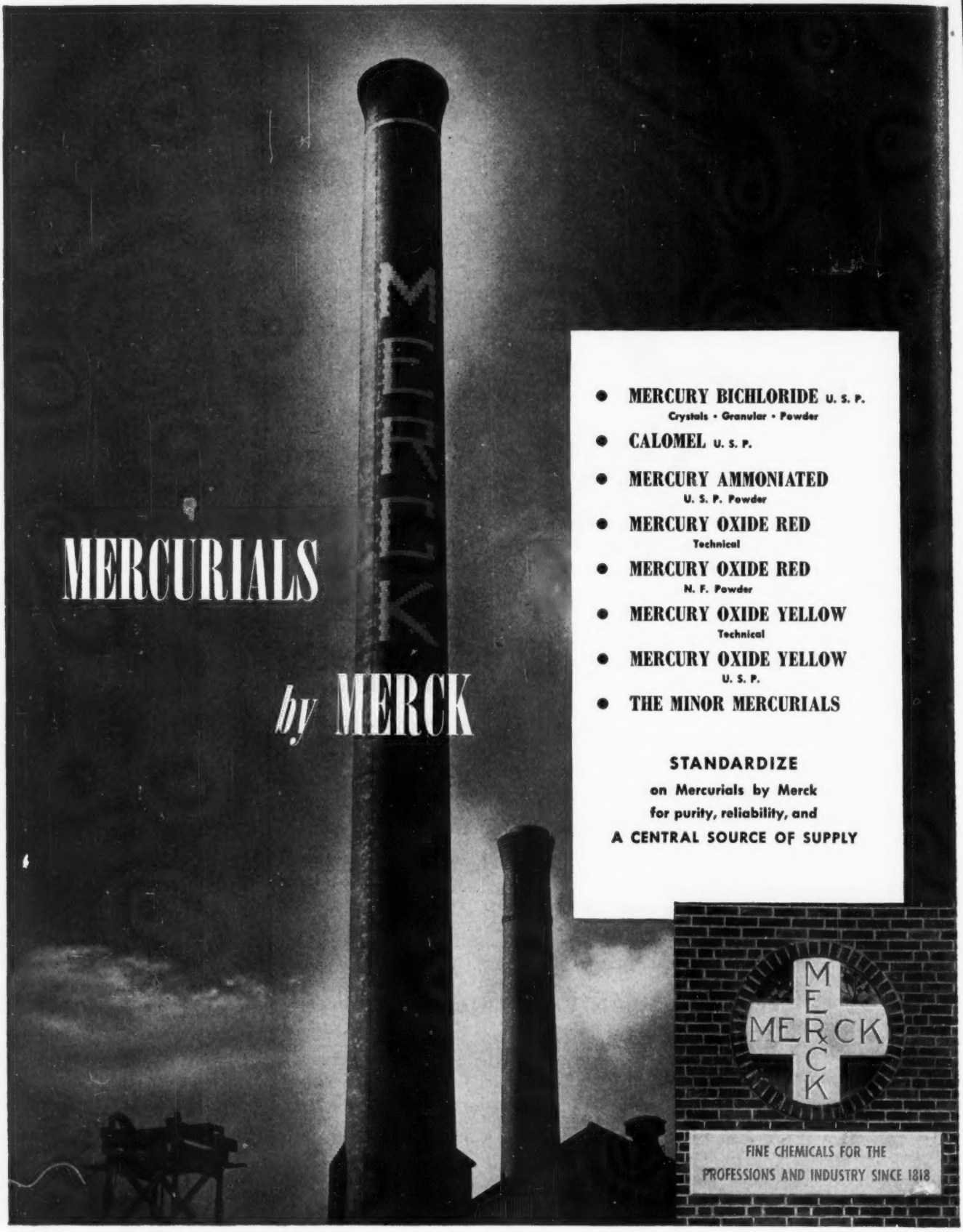

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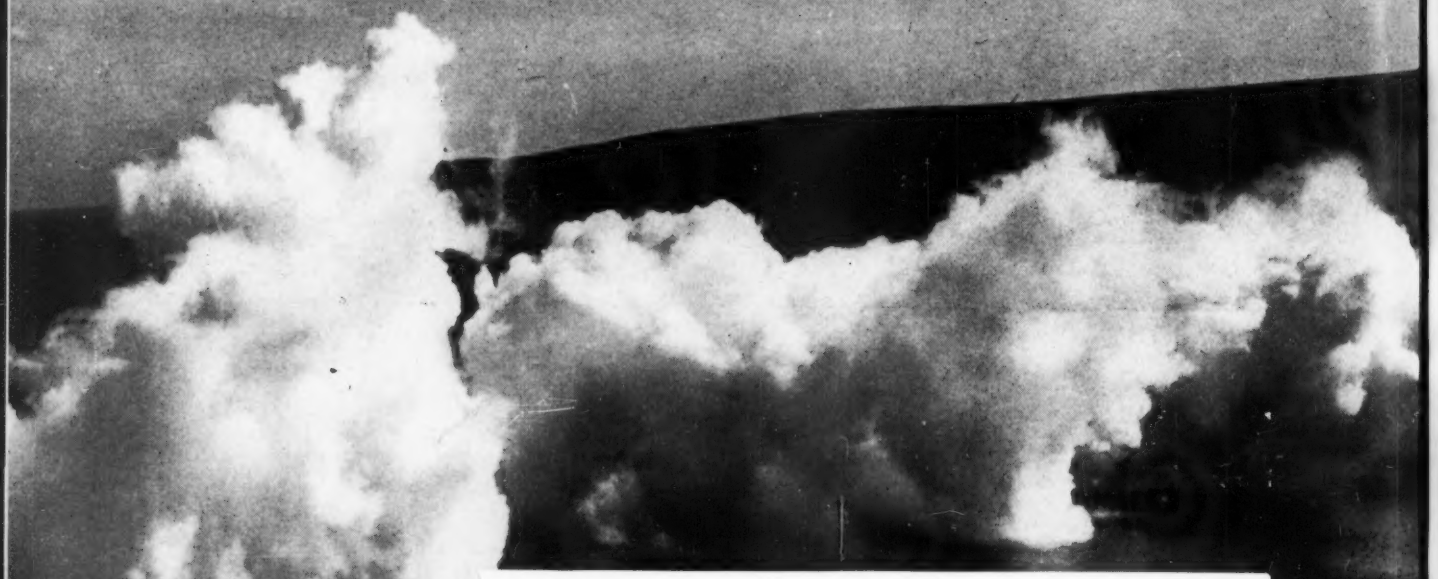

Signal Corps Photo

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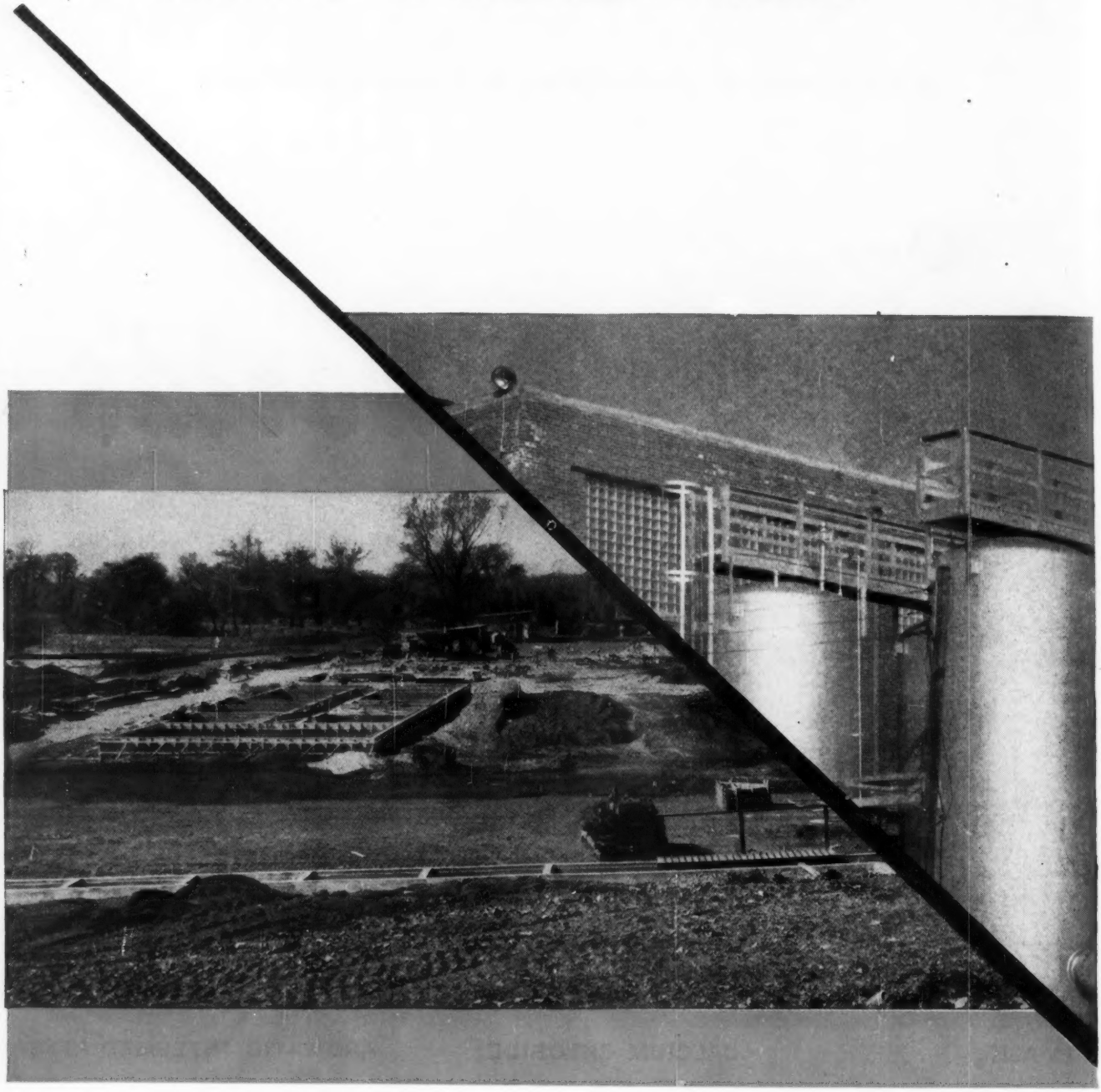

The casual observer is usually amazed when he sees a huge and intricate assembly of walls, towers, tanks, piping and other equipment rise "like magic" from what once may have been a barren field. But to Badger, swift plant construction is an achievement in "know how" organization . . . organization of physical materials, engineering talent, labor, procedure — and timing. Badger uses this formula with good effect in giving Badger clients fast and efficient engineering and construction service. Badger's long experience, favorable access to materials and equipment, capable manufacturing facilities, and well-manned engineering, purchasing, expediting and construction departments have contributed to some remarkable big-project records.

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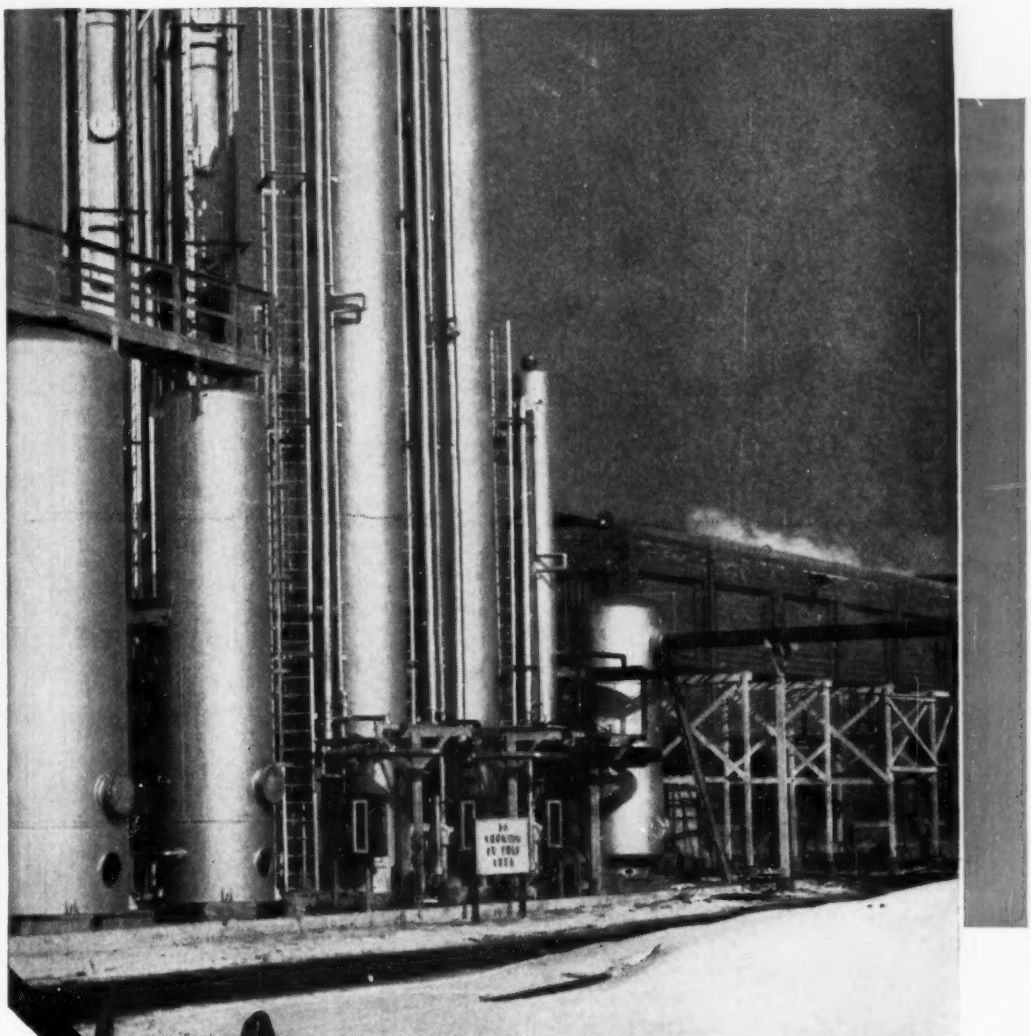

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Costs, Taxes and Research

by ROBERT L. TAYLOR, editor

LOOKING AT SOME OF THE BUSINESS PROBLEMS that are indicated for the chemical industry in 1945, we find, among other things, the matter of costs and taxes. What we have to say here, however, is not so much about costs and taxes themselves as about their relationship to chemical research.

ONE OF THE STRIKING PIECES of information being revealed by profit and loss statements of chemical companies these days is the marked increase over the past few years in the proportion of the chemical sales dollar that is being paid out in the form of taxes and wages. Chemical companies as a group paid over eight times as much in Federal taxes in 1943 as they did in 1939. Hourly wage rates in the industry have gone up 40 per cent since 1939.

At the same time, however, costs represented by raw materials, interest on investment, non-labor operating costs, and distribution costs, although actually showing some increase, have become a smaller proportion of total costs.

THE SIGNIFICANT POINT is that the relatively non-reducible elements that make up chemical costs, as represented principally by taxes and wages, have been increasing noticeably in proportion to those elements which are most susceptible to reduction through research and technology.

The rate of return on research as an investment to reduce costs, in other words, has declined. What return may be realized in the future from either process or new product research done now is, of course, another and a speculative matter. But the fact remains that despite the "cut rate" at which most companies are getting their research today by virtue of its tax deductibility, the return on research under present tax rates provides far from the incentive that will be needed to create new postwar jobs and industries on the scale the planners are talking about.

One need only compare the percentage profits of a research-minded and a non-research-minded company today to see that research is not paying off under present conditions. It is not paying principally because the results of research are being virtually taxed away, but it is also not paying because research has a smaller proportion of the total costs on which to work. At the same time, venture capital for developing the results of research is not exactly being encouraged by the squeeze that is developing between rising costs and fixed prices in the industry.

THUS THERE ARE AT WORK TODAY forces from several different directions which are tending to discourage research, the lifeblood of chemical progress. Chemical companies should, and doubtless will, continue to accept these conditions patriotically as long as the country is engaged in war. But as soon as the last shot is fired every effort should be made to eliminate them, for their continuance can only hamstring an industry which otherwise will be in a position to create thousands of new jobs and products for better postwar living.

A New Year's Resolution

IN ANTICIPATION OF A difficult year ahead, let those of us who make and sell chemicals resolve:

1. To intensify our efforts toward winning the war.
2. To help keep costs and prices down through greater efficiency and economy.
3. To conserve critical materials.
4. To meet war production requirements on time and in full.
5. To prepare now for maintaining and creating chemical employment after the war.
6. To reaffirm our own faith in American principles, and by our works, actions, and words make the chemical industry a working example of those principles and what they can accomplish.

Save On Steam

ALONG WITH PAPER, which we know something about from first-hand experience, coal is occupying one of the top berths on the critical shortage list this winter. The bottleneck is both in manpower at the mines and in facilities and manpower for distribution.

As large users of coal for process steam and power, chemical plants will be serving their own interests as well as aiding in the overall conservation effort if they will make it a point to check all points of possible savings in steam and coal, both in their manufacturing operations and in the power plant. R. F. Stilwell of the North American Coal Corp., who

has spent many years studying boiler-plant performance, gives some practical pointers in this issue of CHEMICAL INDUSTRIES on how to get more steam out of less coal in the power plant.

Next month we have been promised a similar article by a member of the chemical industry on ways to save process steam in the manufacturing plant. We believe both of these articles will be worth more than casual reading by chemical people concerned with steam production or utilization. War can't be fought without coal, and we've all got to help stretch the supply.

The Technical Mission to Germany

IN PREPARING A TECHNICAL MISSION to go into Germany immediately behind the Army (see page 8 this issue) our government recognizes the value that some of the German technological developments could be to this country in continuing its war against Japan, not to mention peacetime usefulness later on.

For this very same reason, however, we can expect that the Germans are not going to leave very much behind for prying eyes. What plans, data, records and models cannot be moved to Japan will doubtless be destroyed with systematic German thoroughness, for unlike 1918 the Deutschlanders even in capitulation are not expected to consider the war over as long as they have an ally carrying on elsewhere. If they can get there it won't be surprising to hear some day that German scientists were setting up shop in Japan well before V-E Day. Already one Japanese submarine reportedly on its way to Germay has been intercepted by our Navy. A prolongation of the Japanese war could be regarded as very desirable by Germany both from the standpoint of "dragging our enemies down with us" and as a means of weakening the Allies in preparation for an eventual comeback.

However, a technical mission to Germany should be well worth while even if it doesn't find any plans for future V-weapons. It will be rather difficult for the Germans to obliterate entirely a synthetic gasoline plant or robomb factory on the scale that we know these facilities to be operating in Germany. Our technologists may have to be detectives, too, but they should be able to contribute much to the reconstruction of the scene and tools of the crime.

Diplomacy for Trade

THE UNITED STATES IS GROWING UP. Having passed through the shy, awkward self-consciousness of adolescence, we are now attaining the stature of maturity and taking upon ourselves the responsibilities of adulthood.

Until now we have been busy with our own affairs—building, growing, winning a continent and taming it to our uses. From our single excursion into world politics, in 1917, we withdrew hastily and timidly, limiting ourselves thereafter to "I'll scrap my navy if you'll scrap yours" diplomacy. If our dealings since World War I have been characterized by anything save a negative isolationism, that character has been a quest for the Holy Grail of Democracy. Our zealous knights have gone forth from their ivory towers, blessing those who subscribe to our ideals and damning those who have chosen a different course.

The policies of England and Russia, it is becoming clear, are not so dazzlingly white nor ethereal. Theirs is a hardboiled diplomacy of imports and exports, of trade balances and power balances. With an eye to their needs they make friends where it will profit them—and who is to say that it does not pay off?

We have never been in a better position to speak up and make our voice heard in world matters. We in the chemical industry have reason to be partciularly eager that our Departments of State and Commerce work even more closely together than they have in the past, making decisions which will insure the future prosperity of our nation.

The reorganization of our State Department, coming as it does at this time of our greatest influence in world affairs, is bound to be significant for good or ill. Many of the new secretaries are practical men; we may hope that our international speech will acquire a more practical accent.

Disabled Veterans—Are You Ready for Them?

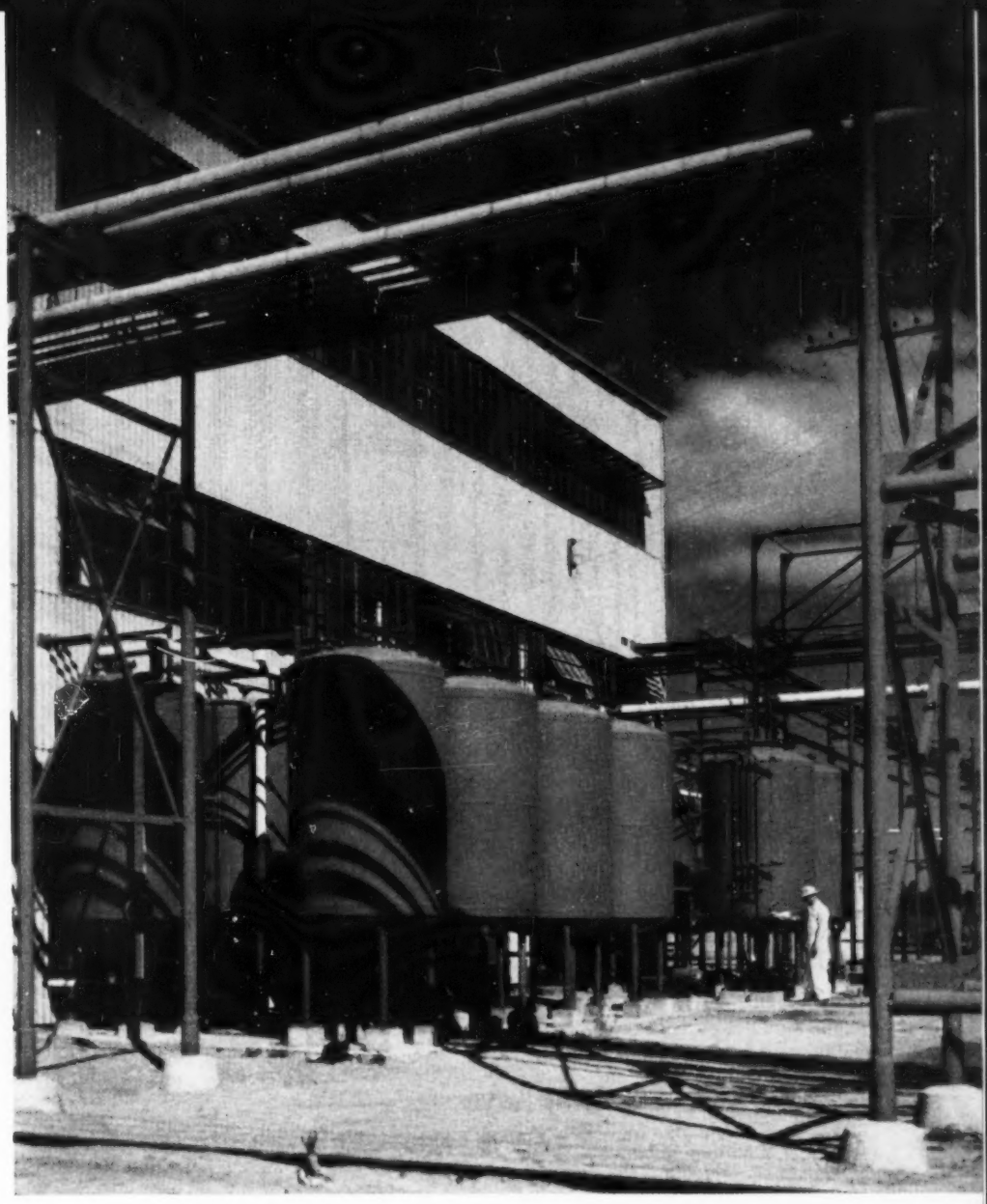
TOTAL CASUALTIES IN THIS WAR have passed the half million mark—twice the total for World War I, and the rate is still going up.

These figures plus the rising number of casualty discharges that are actually appearing now in civilian life bring home hard the size and imminence of industry's task of providing employment for disabled veterans. The job of placing these men is a responsibility and obligation that must be accepted individually by small concerns as well as large ones, chemical companies as well as textile mills and electrical manufacturers.

The number of concerns that have actually done something about getting ready to reemploy physically disabled veterans is lamentably low, according to a recent cross-sectional survey of industry in general. The job is strictly a management one, and chemical companies which have not already taken steps to prepare for it should get busy at once.

The first step is to assign the responsibility to some one high enough to have some authority. He doesn't necessarily have to do all the work, but he must have the power to back up the man who does. From there it is a matter of job analysis to find out the physical requirements for each job in the plant—which ones can be done minus an eye or an arm or a leg. When a disabled veteran applies for a job it is then a relatively simple matter to match up the veteran with the job. For the jobs that these men can do, they are not disabled.

The broader overall problem of reemployment of veterans in general is one that management is going to have to face eventually—we hope soon—and would be wise to prepare for early, but the handling of the disabled men is already with us and demands immediate attention.



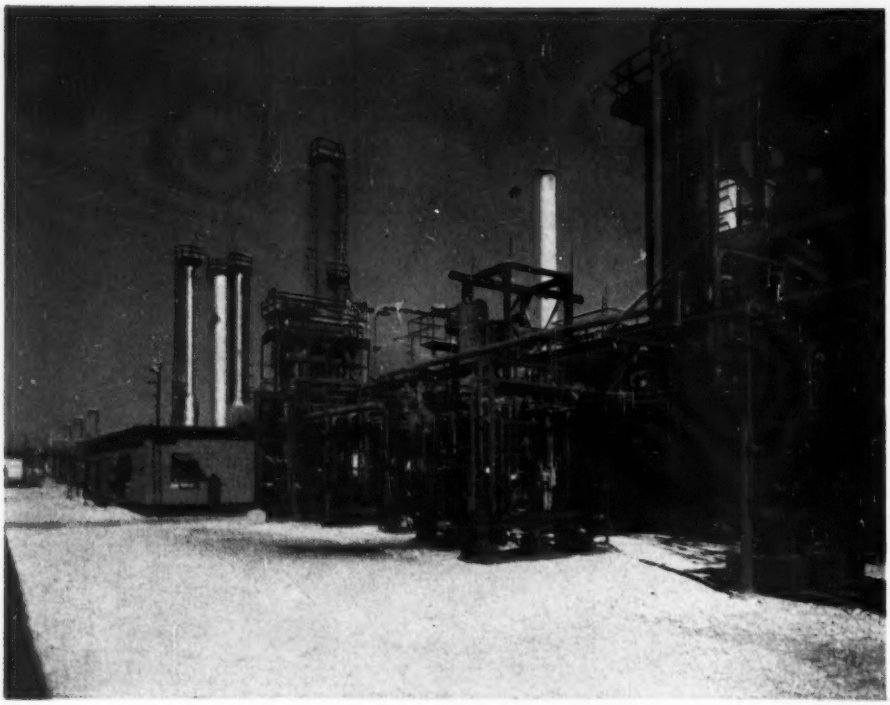
by ALDEN B. DOW
Architect
Houston, Texas

COLOR — A New Element in Chemical Plant Design

HUMAN beings from prehistoric times have enjoyed and reverenced color. Still, until only recently we have expressed ourselves instinctively in color without knowing the reason why. Colors gave us pleasure. We were awed by them. Colors represented the important things of life infinitely better than anything drawn, painted or otherwise represented in black and white. That has been the sum and substance of what we knew about color's effect on ourselves.

THE DOW CHEMICAL COMPANY is one of the first industrial organizations to utilize bright hues and shades to ease the tasks of employees. Alden B. Dow, who worked out the color schemes for the Dow plants, is one of the country's leading modern architects. Seeing beauty as infinite functionalism, with color playing an important part, he feels that there is no sound reason why industrial plants, including chemical plants, must be the drab and unsightly structures that they usually are. Mr. Dow recently won a competition for the design of a $500,000 war memorial to be constructed at Temple, Texas.

Now, however, a greater understanding of color is becoming apparent. Industrialists are discovering that color can have a startlingly good effect upon the workers in a plant or



Blue-green relieves the red soil color and red balances the blue-green and blue sky.

office when it is utilized according to certain rules.

The days of the dull, drab factories should soon be gone, as more and more industrialists see the benefits of such use of color by the few pioneers who have already put it to work for them. The Dow Chemical Company has been one of the first to make the change. In its new plants in Michigan and Texas brilliant colors greet the visitor everywhere.

These hues are not intended merely to satisfy the aesthetic sense of employees or visitors. The long rows of bright red or yellow structural steel supporting lines of blue and white pipe; the impressive green, yellow and blue-green tanks, which relieve the intricate steel work, are not just some artist's idea of beauty, but are the result of long study based on demonstrable facts. The principal purpose of Dow's use of colors is to decrease employee fatigue through greater ease of working conditions.

THE VISITOR'S FIRST CONSCIOUSNESS is of a maze of color. It makes him smile for it does produce a happy effect. Inside the buildings, instead of the somber black or monotonous grays that have been customary, there are clear, clean colors that Walt Disney might take pride in using in one of his most fanciful movies. Though the bright new clothing of old and new buildings at Dow is an excellent external advertisement for the company, its chief aim is internal, being based upon facts of vision which contribute to the welfare of the employees and so to the productivity of the company.

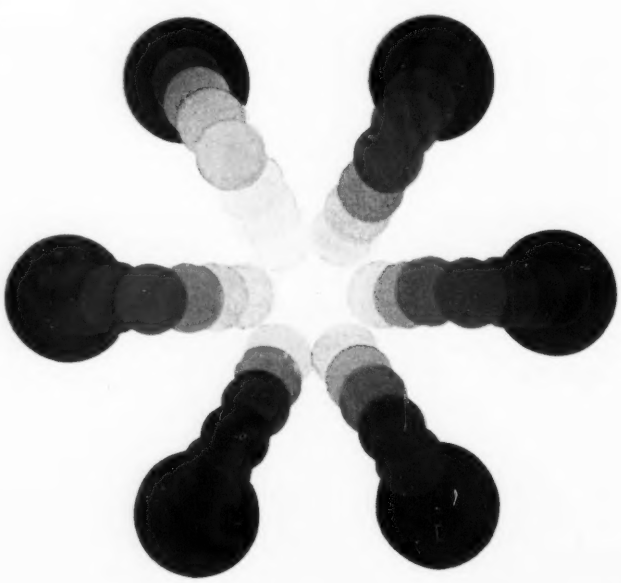
Consciousness of dirt is an important by-product of the planned use of color, and what is more, it is contagiously constructive. If we paint up, we clean up; if we clean up, we fix up; if we do any or all of the three, we are creating jobs and making America's postwar economic good health more certain.

The eye sees all things in terms of color, and it is believed that each distinct color, as registered on the brain, is recorded through particular receptors in the eye. There are conflicting opinions as to the exact process, but this is relatively unimportant. The important fact is that over-work or fatigue of any simple cell or any complicated mechanism of the human system causes deterioration; and lack of use, by reason of "starvation," causes atrophy. Either or both of these final results destroy the equilibrium or health of the human system.

It is, therefore, of paramount importance that man exercise and relax all of the human powers, giving each its share of rest and work.

If we concentrate upon a red object for a half minute or so, and then turn to something colorless, the surface of the latter will appear for an instant blue-green. Likewise, if we first concentrate upon blue-green, the colorless surface will momentarily appear to be red. This reaction effect holds true for all colors. It is Nature's way of informing us that blue-green is a relief to red and that red is a relief to blue-green. By similar experiments we find that blue relieves yellow and yellow relieves blue; that green relieves purple and purple relieves green.

We call these relieving colors "complementary," be-



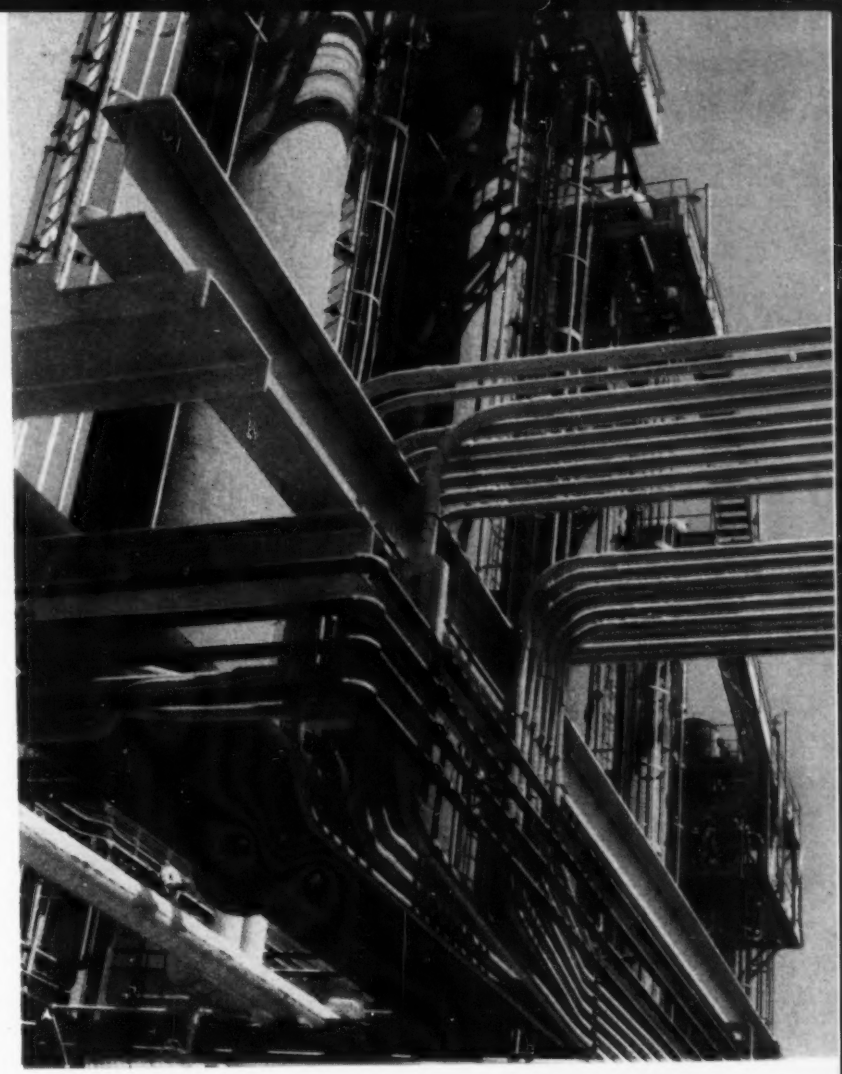
cause when mixed in proper proportions on the retina of the eye, one counteracts the other, producing the effect of neutral gray or white. This balance can be achieved with a mixture by taking the color which results from the combination and balancing it with its complement. It is apparent that infinite combinations are possible.

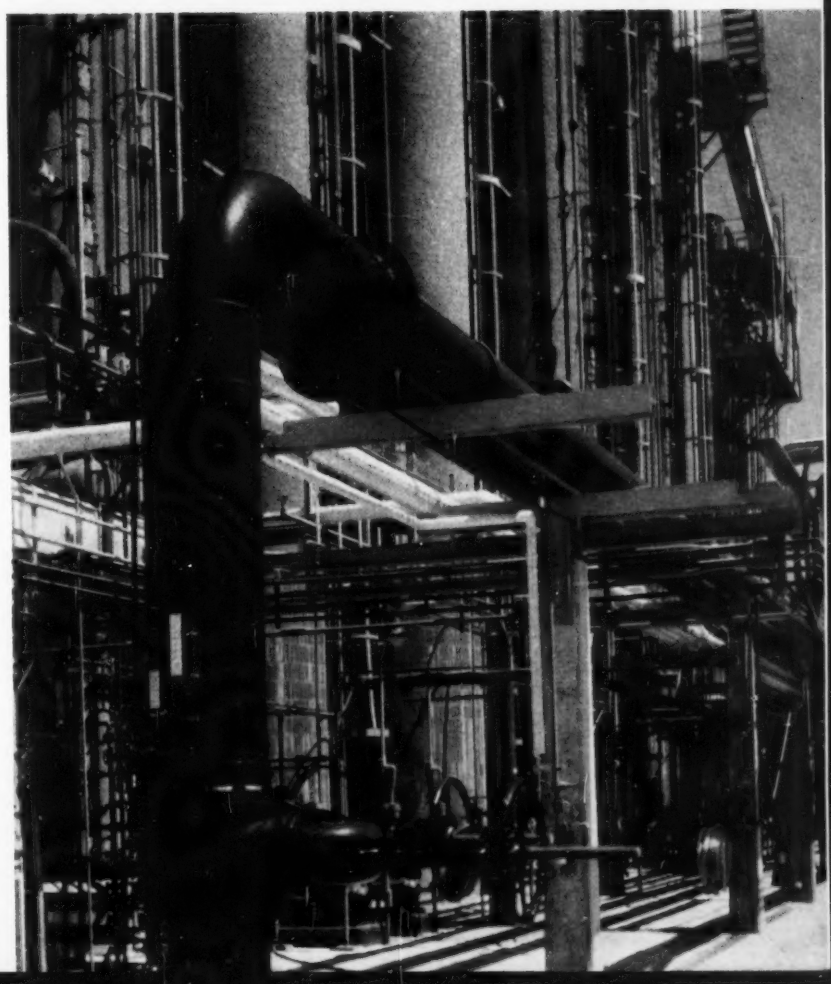
IF WE TAKE SAMPLES of full strength colors and place those that have similarities next to each other on a table, we find they form a circle. Reading this diagram, we find colors progressing from blue to purple to red to yellow to green to blue-green and back to blue. On the circle we shall find balancing or complementary colors opposite each other.

We know that white light is made up of all of the colors, so let us call the center of our circle "white." Now let us take the tints of the various colors and place them on the inside of the circle, progressing from full strength to white in the center. Now take the shades of the various full strength colors and place them on the outside of the circle, arranging them so that they progress from the full strength to black.

In analyzing the chart we shall find that pink and brown, for instance, are both offsprings of red. So, when considering the mechanism within the eye we should expect a similar effect from red, pink and brown. On the other side of the circle, we find that the complementary colors of red, pink and brown are various shades or tints of green.

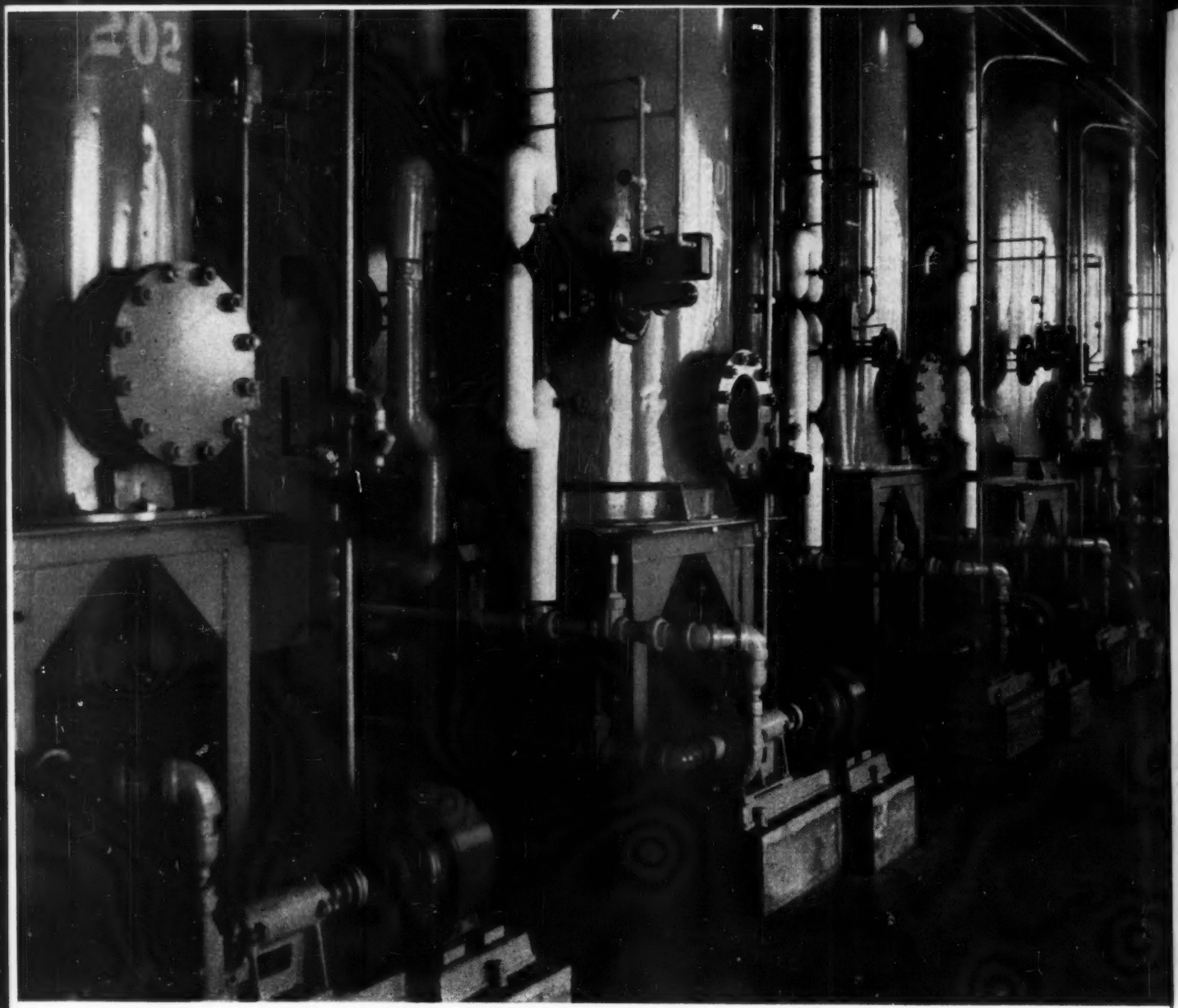
WORK REQUIRING close concentration has been improved considerably by surrounding the color of that work with its complement. A piece of magnesium or steel machined under daylight conditions reflects an excessive amount of blue. It has been found that expert work is turned out more easily and surely when the bench and other surroundings of the metal are painted yellow, the color that relieves blue, for the reasons that visibility is greatly improved and the workmen may concentrate more fully because rest is afforded the eye with-





Top: **Planned use of color makes us architecturally conscious**

Bottom: **Colors inspire superior workmanship**



Strong, distinct colors make individual parts conspicuous

out its turning aside from the work. Following the same line of thought, a machine which works yellow-reflecting materials, such as certain plastics or brass, should have blue surroundings.

BUT THE PARTICULAR COLOR OR HUE is not the only factor to consider, for there is also the matter of value —the lightness or darkness of a color. We have all noticed that a white spot on a black background is more easily seen than a white spot on a light gray background. In the same way, a light blue is easier to see over a rust or dark yellow background than it is over a brilliant yellow background. Here again is a matter of balance of lightness against dullness or vice versa. But the lightness or dullness of a color plays another part aside from the ease of visibility. Bright strong colors add life to our surroundings. They produce a happy effect. We may find people who haven't studied the subject joking about bright color schemes but never seriously objecting to them.

Now the industrialist who has chosen red, pink or brown as one of his colors, knows the color which would be most effective in relieving or resting the eye after it has registered one of the chosen colors. This relief color should of course be a shade of green, and the same method will work for any other color he may have chosen in the first place.

HERE IS THE MAIN OBJECTIVE of The Dow Chemical Company in using colors—the balance of eye effort. The alternate exercising and relaxing of the visual mechanism which results in the conservation of the human machine, should always be the chief aim of color and design.

In industry, the true value of this process is difficult to measure, but The Dow Chemical Company does know from experience that the balancing of color effort can and does add considerably to the efficiency and stability of the human mechanism.

UTILIZATION of LIGNIN
by Zinc Salt Treatment

by J. SEIBERLICH, Engineering Experiment Station,
University of New Hampshire

ALCOHOL CAN BE PRODUCED ECONOMICALLY from wood waste if the residual lignin is profitably utilized. Conversion of it to a thermosetting composition useful as wallboard is one way in which this may be done.

THE Eugene, Oregon, plant described in a previous issue[1] will start producing alcohol for wartime needs this year. Whether it will continue to operate in peacetime depends upon how efficiently the by-product lignin can be used. This is a serious problem, for ten pounds of this material is obtained for every gallon of alcohol produced.

The Engineering Experiment Station of the University of New Hampshire was interested in certain aspects of this problem and requested some lignin waste from the United States Forest Products Laboratory in Madison, Wisconsin, where the experimental wood saccharification plant is located.

The material as received was a brown, fibrous, irregular mass, with a typical caramel odor, containing quite a number of large chips. Its pH was between 2.85 and 2.75. The vast literature already accumulated on the subject of lignin showed that the problem had been approached from many sides, such as oxidation, reduction under normal conditions, under heat and pressure, methylation, bromination, extractions, acid and caustic treatment, etc. The Engineering Experiment Station was not interested in repeating the above-described experiments, but it was thought worthwhile to investigate further a less-known reaction of lignocellulose—its treatment with zinc salts.

R. Combes[2] has described a treatment of lignocellulose with zinc oxide or zinc sulfate and afterwards reducing this reaction product with hydrogen sulfide. This reduced lignin product forms an inner condensation product in the presence of concentrated sulfuric acid which turns bright red.

This reaction was applied in a modified form to the Scholler lignin received from the United States Forest Products Laboratory.

Zinc Treatment

Fifty grams of the wet lignin sample was heated with 10% solutions of zinc sulfate or zinc oxide on the reflux condenser for two hours. Afterwards, the lignin was separated from the deep red-brown solution by filtration. It was then washed several times with distilled water and subjected in an Erlenmeyer flask to hydrogen sulfide gas. After this treatment the material was air dried and molded under a pressure of 2,000 psi. at 300° F. for three minutes. These molding conditions simulated the usual commercial practice. The sample was gassed several times. A dark brown disc was obtained which was subjected to water absorption tests, comparing it with a disc prepared from untreated Scholler lignin. The results are compiled in the accompanying table under Nos. 1 and 2.

Improvement of the reducing action of hydrogen sulfide by the addition of formaldehyde was attempted. The procedure was the same as mentioned above except that after hydrogen sulfide treatment the material was heated for one-half hour in a commercial formaldehyde solution. The results are given under No. 3.

From the experiments on Nos. 1, 2 and 3, it is noted that a treatment with zinc sulfate shows a substantial decrease in the water absorption in the first three hours as compared with the untreated lignin, but that the formaldehyde-treated lignin is even more resistant.

Tetrasulfide Treatment

The influence of sulfides on this type of lignin was also studied, and the following experiments were made: Fifty grams of Scholler lignin waste was refluxed for thirty minutes with a 10% sodium tetrasulfide solution after which the mass was filtered and allowed to react with ethylene chloride. In another series, lignin was first allowed to react with ethylene chloride and then condensed with sodium tetrasulfide solution. These products were air dried and subjected to molding under the same conditions mentioned above. The results obtained are compiled under Nos. 3 and 4 of the same table. Equal amounts of Nos. 3 and 4, in the dry state, were mixed mechanically and subjected to the same molding procedure. The results of this experiment are given under No. 6 of the table, but it appears that no improvement was obtained.

Comparison with Other Plastics

In order to establish some comparison with known plastics of similar type, Masonite products and the wood pressed wallboard (No. 10) which was developed by the Engineering Experiment Station are compiled under Nos. 7, 8 and 9 of the table. The water absorption after twenty-four hours of the Masonite products and of the wood pressed wallboard is greater than that of the lignin sample No. 3. Nevertheless, it should be emphasized that the Engineering Experiment Station wood pressed wallboard showed less water absorption after three hours than sample No. 3 after one hour.

During the first three hours samples Nos. 1, 2, 4, 5 and 6 pick up water fastest, while sample No. 3 picks up water considerably slower. This is important since products similar to wallboards require low water absorption during relatively short periods of immersion.

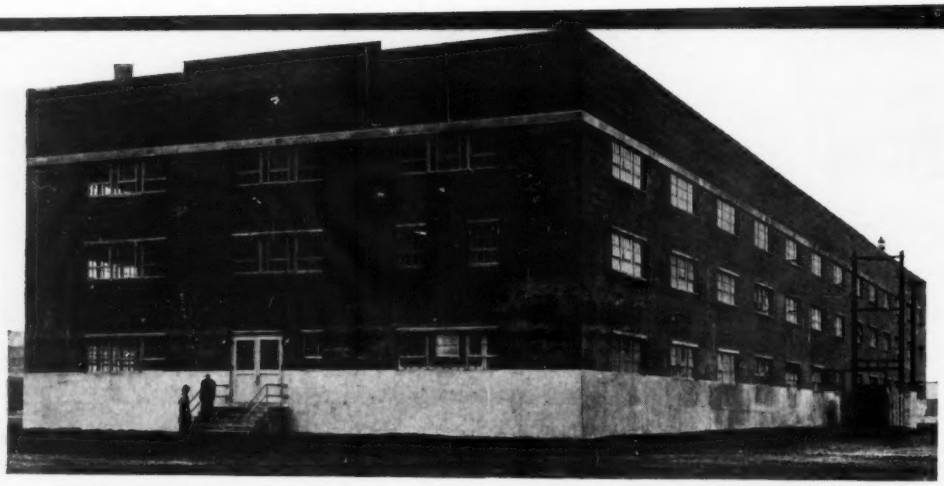
Literature Cited

1. Johnson, "Ethyl Alcohol from Wood Waste," CHEMICAL INDUSTRIES, Vol. LV, p. 226 (August, 1944).
2. *Bull. des Sciences Pharmacal,* 13 (1906), 293-6; C. *1907 T.* 132.

Condensed from a report presented at the Quarterly Meeting of the Northeastern Wood Utilization Council, Boston, Mass., Dec. 14, 1944.

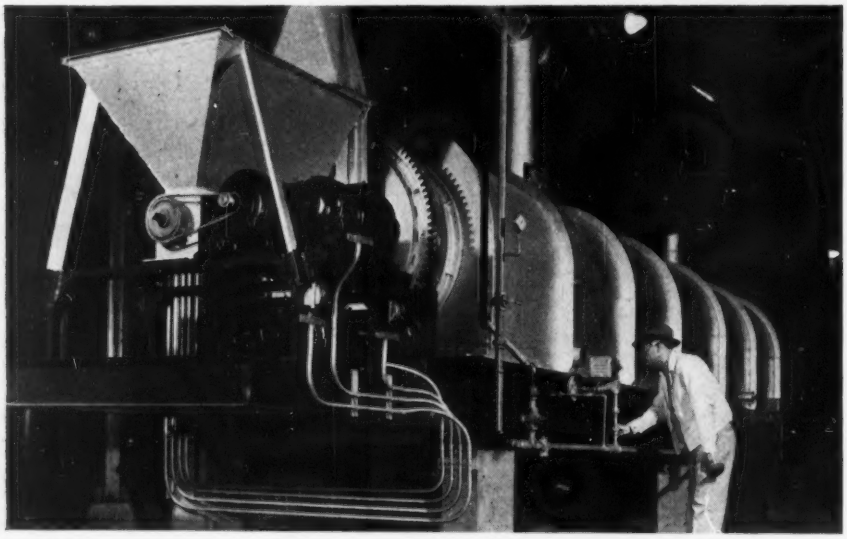
Water Absorption

No.	Material	Weight Increase in Per cent ½ hr.	1 hr.	1½ hrs.	2 hrs.	2½ hrs.	3 hrs.	24 hrs.
1	Scholler lignin	15.2	18.7	19.8	20.9	21.6	22.2	26.9
2	Scholler treated with $ZnSO_4$—H_2S	7.0	9.1	9.47	9.86	11.1	11.6	23.0
3	Scholler treated with $ZnSO_4$—H_2S & HCHO	5.65	5.87	6.61	7.0	7.0	7.0	14.6
4	Scholler treated with $C_2H_4Cl_2$—Na_2S_4	10.8	14.7	16.8	19.1	20.4	21.6	24.6
5	Scholler treated with Na_2S_4—$C_2H_4Cl_2$	22.3	30.6	34.4	36.6	37.3	39.0	49.1
6	Mixture of 4 and 5	12.0	14.6	16.3	17.4	18.9	19.9	30.5
7	Black tempered hardwood (Masonite) ⅛"	3.71	5.89	6.50	7.78	9.69	11.32	21.7
8	Untempered ⅛" hardwood (Masonite)	2.72	4.46	4.53	6.72	8.09	9.23	20.3
9	Tempered presswood ⅛"	3.77	4.18	5.29	...	7.63	9.47	18.0
10	U.N.H. (E.E.S.) wood pressed wallboard	2.59	3.09	3.85	4.39	4.60	5.72	19.92

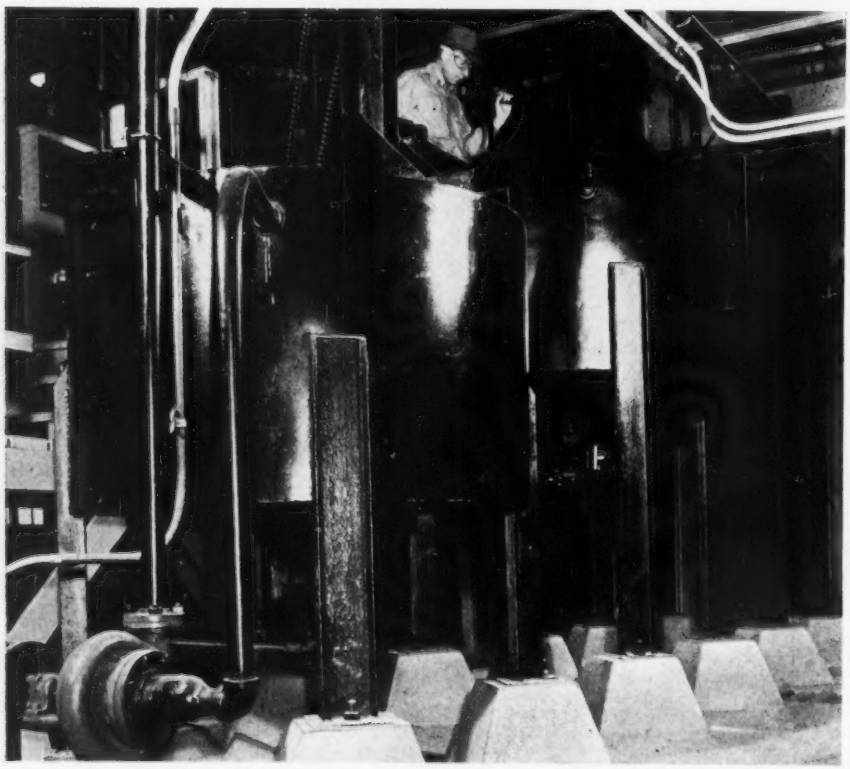


Aluminum Research Laboratories' new development laboratory at East St. Louis, Ill.

ALCOA'S



The laboratory contains a complete Alcoa combination process for making refined alumina from low-grade bauxite. Above is a rotary dryer for drying bauxite and other materials.



A miniature three-stage Dorr thickener for settling and washing "red mud" from the Bayer process. This is a small-scale duplicate of the unit in use in the main commercial plant.

THE new alumina development laboratory of Aluminum Research Laboratories, located at the East St. Louis (Ill.) works of Aluminum Ore Company, was designed and built at a cost of $750,000 to provide pilot plant facilities primarily for the development of improved operating technique, economy in use of materials, and improved quality of product in the Alcoa combination process for the extraction of alumina from low grade bauxites.

Domestic reserves of high grade bauxite required for the Bayer process were seriously limited even before the war. The greatly expanded alumina demand and the difficulty of bringing in foreign bauxite forced the use of low grade bauxites which were not considered commercial before the war. In the Bayer process, every pound of silica in the ore causes a loss of one pound of alumina, one pound of soda ash and one pound of lime. High silica ores are generally lower in alumina content than low silica bauxite; therefore, the use of low grade ore in the Bayer process is extremely wasteful of materials and manpower.

Aluminum Research Laboratories had been working on new methods for extraction of alumina from low quality aluminous materials for years and had developed a laboratory process for recovering both alumina and caustic from Bayer plant waste. Fortunately this equipment could be added at existing plants and at those under construction and be operated in combination with the Bayer process.

Because of the urgent requirement for aluminum, the difficulty of obtaining foreign ore, and the rapid depletion of domestic reserves, construction of a pilot plant and four full scale production units* was carried on concurrently. The pilot plant was completed in time to develop operating procedures used in the production plants when they were completed, but production operation does not permit experimental work necessary to develop such a process to its full value; hence the development laboratory.

* Baton Rouge, La.; Mobile, Ala.; Hurricane Creek, Ark.; E. St. Louis, Ill.

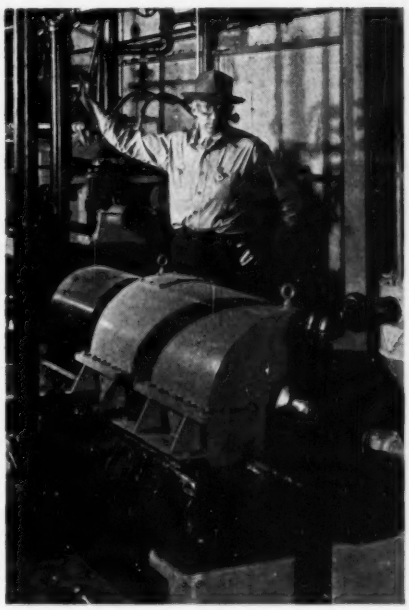
Costing $750,000, this flexible experimental plant can reproduce with variations the new Alcoa "combination" process for alumina from low grade bauxites.

NEW ALUMINA DEVELOPMENT LABORATORY

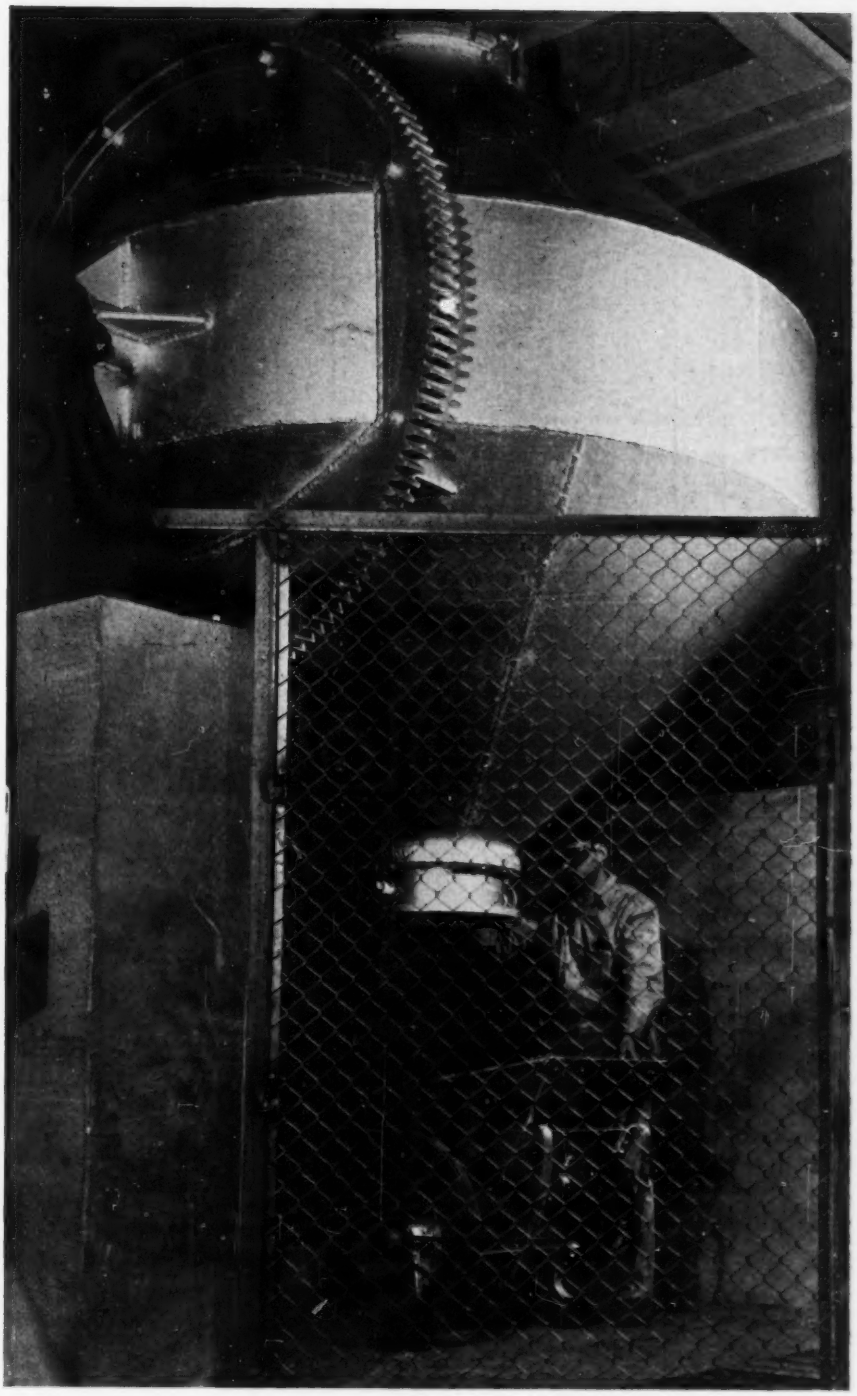
The use of low grade bauxite brings many problems not encountered in the use of high quality ore. There are more impurities, some of which are troublesome, there is more waste to be disposed of, and the material filters differently. In order to provide the flexibility required, the laboratory is equipped with a complete Bayer process unit which can be operated separately or in combination with waste recovery processes at any point desired. It includes mud settling and washing units, a variety of filters and centrifuges and is capable of handling sufficient quantities of materials to permit determination of build-up of various impurities in the system when in continuous operation.

The building which houses the development laboratory is of brick and steel construction. It is 80 ft. wide by 340 ft. long and has two mezzanines giving a total of 46,300 sq. ft. of floor space.

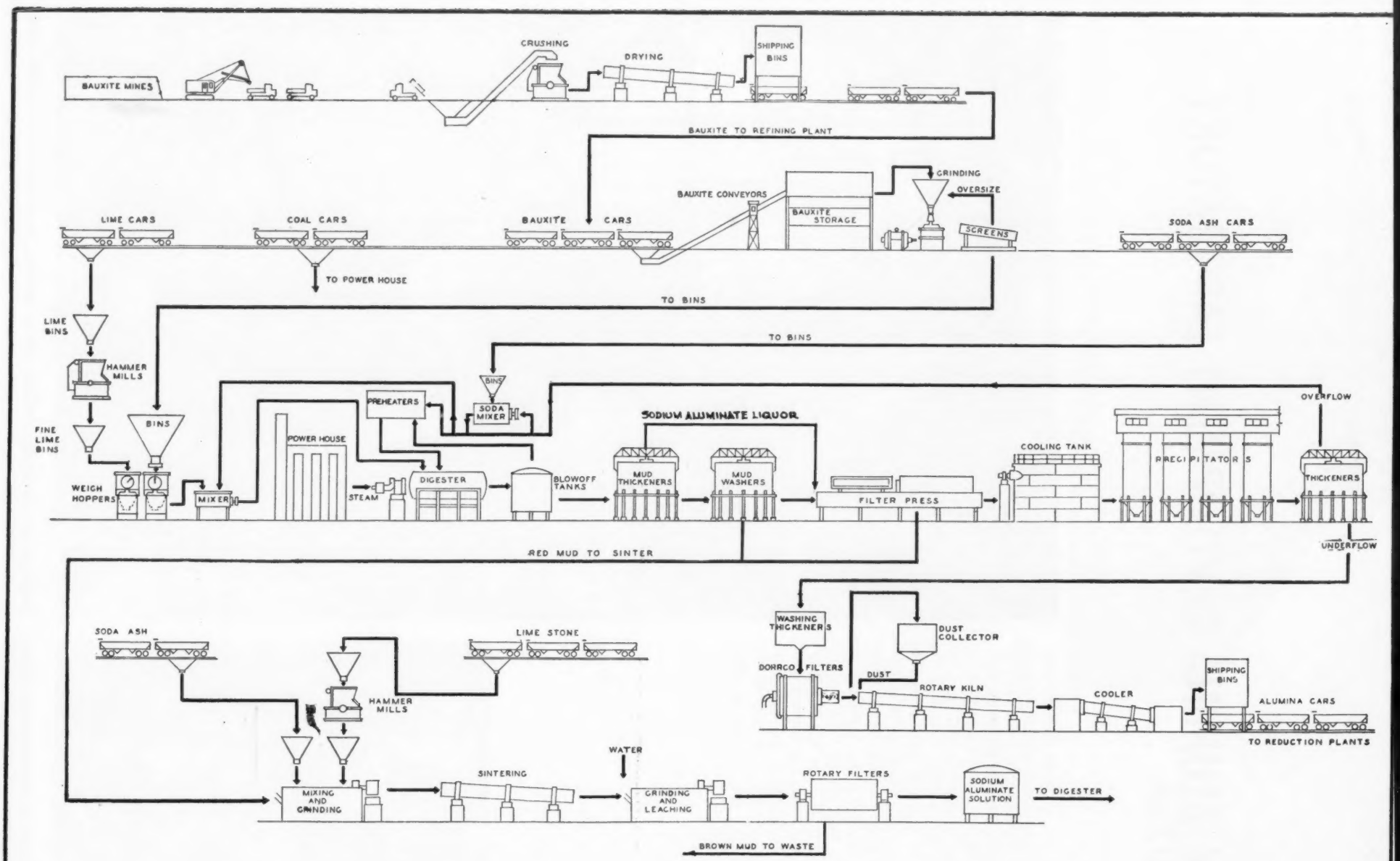
It contains machinery which reflects on a small scale the equipment actually used in the new combination process. For example, a miniature three-stage Dorr thickener has been set up for settling and washing the "red mud" waste from the



A Bird continuous centrifugal for experimentation in separating solids from liquids.



Conical blender for blending materials such as limestone, bauxite and soda ash. The laboratory is equipped to provide complete layouts for any alkaline digester or sinter process.



BAUXITE to ALUMINA—Alcoa Combination Process for high-silica ores

Bayer process. Likewise, the huge aluminum hydrate precipitators used in the main plant have their small scale counterparts here in tanks approximately 18 ft. high.

For separating solids from liquids, a small Kelly filter press is employed which reproduces exactly the action of the large filter press in separating the "red mud" from the sodium aluminate liquor. In another section of the laboratory a scale model of a continuous leacher mixes the sinter and liquor and leaches out the insolubles from the soluble matter. Adjacent to this machine is a small rotary kiln used for drying bauxite and other materials.

For reducing raw materials to proper fineness there is a two compartment ball mill. This unit, too, is a small scale edition of the ball mills employed in the main plant to grind the "red mud" slurry preparatory to pumping it to kiln vat tanks.

Models of both the Dorrco and the Oliver vacuum filters are found in this building. Both of them are used for filtering sinter slurry. A continuous centrifugal has been set up for experimentation in separating solids from liquids.

Work done by the huge 250-ft. rotating kilns in the main plant is reflected in miniature in a small 60-ft. rotary kiln, with variable speed and adjustable pitch, which reproduces the working conditions found in connection with heating and drying the slurry and reducing it to alumina.

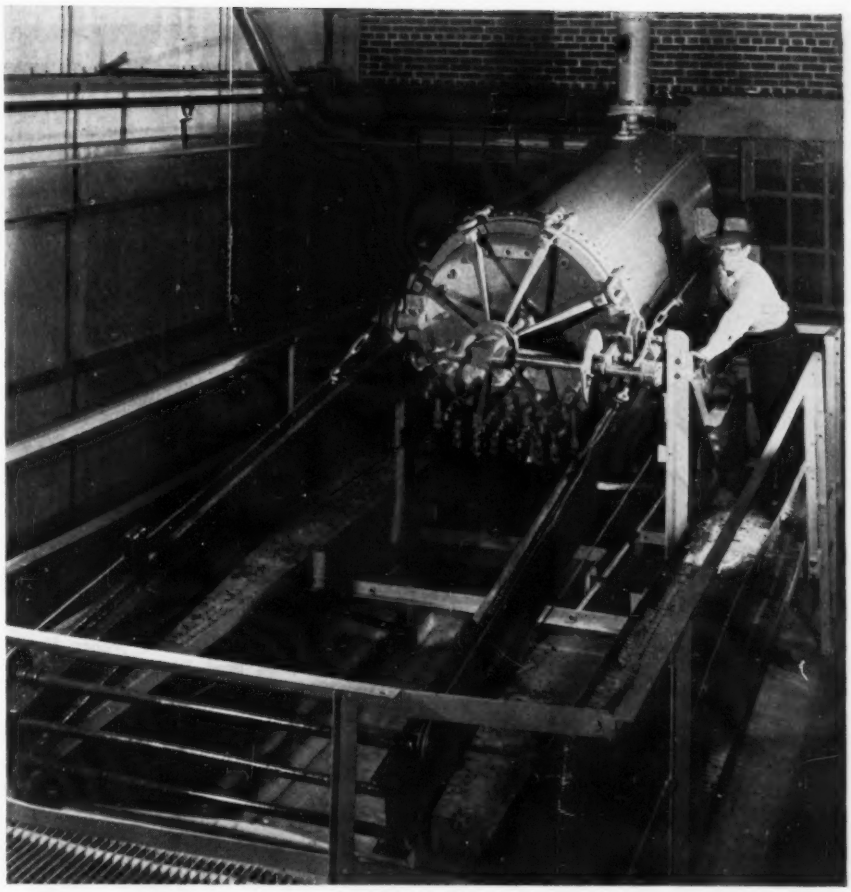
The equipment in the laboratory is so arranged that it can be connected into complete layouts for any alkaline digester or sinter process, or combination of these processes, to handle any type of raw material.

Alcoa Combination Process

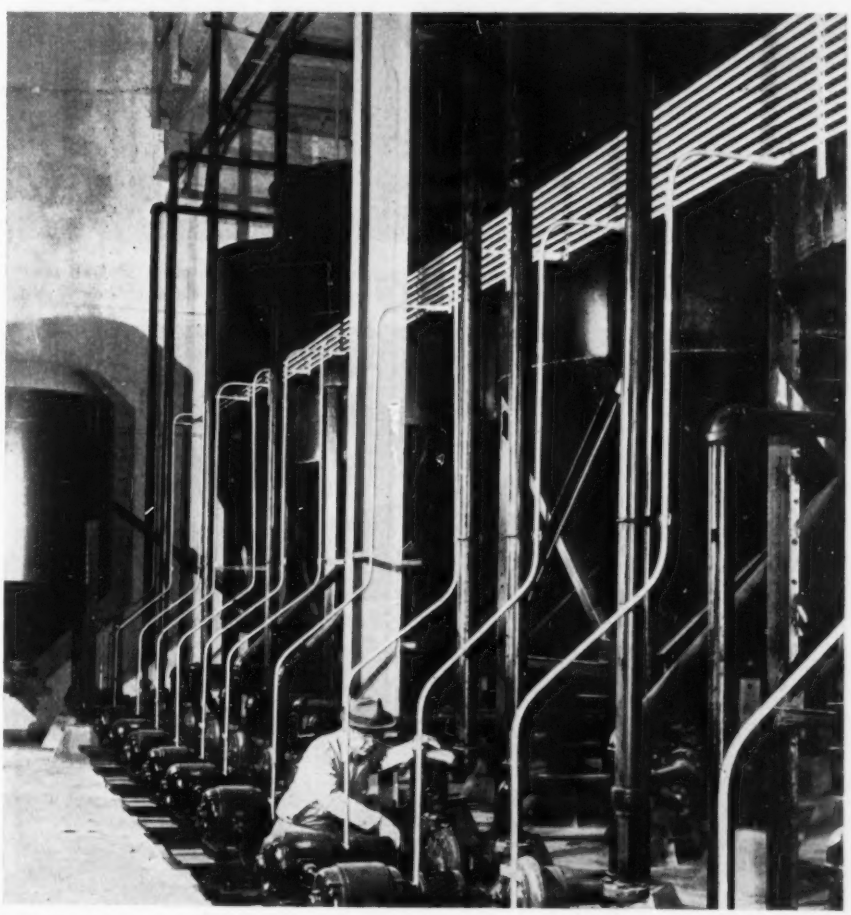
The Alcoa combination process, for which the laboratory was principally designed, combines the Bayer process with a sintering operation which permits economical working of low-grade, high-silica bauxites such as are found in substantial reserve in this country. In fact, the efficiency of the combination is said to be so good that the proportion of alumina recovered from low-grade bauxites containing 10 to 18 per cent silica is higher and the soda loss lower than in the Bayer process alone operating on high-grade bauxite.

In the Bayer process, bauxite is digested with caustic soda to dissolve the alumina, leaving the impurities as an insoluble residue, or "red mud," which is separated from the solutions. The dissolved alumina is then precipitated from the liquor as aluminum trihydrate, washed and calcined to produce anhydrous alumina. Any silica in the bauxite, however, forms an insoluble sodium aluminum silicate during the caustic digestion which carries both soda and alumina into the "red mud."

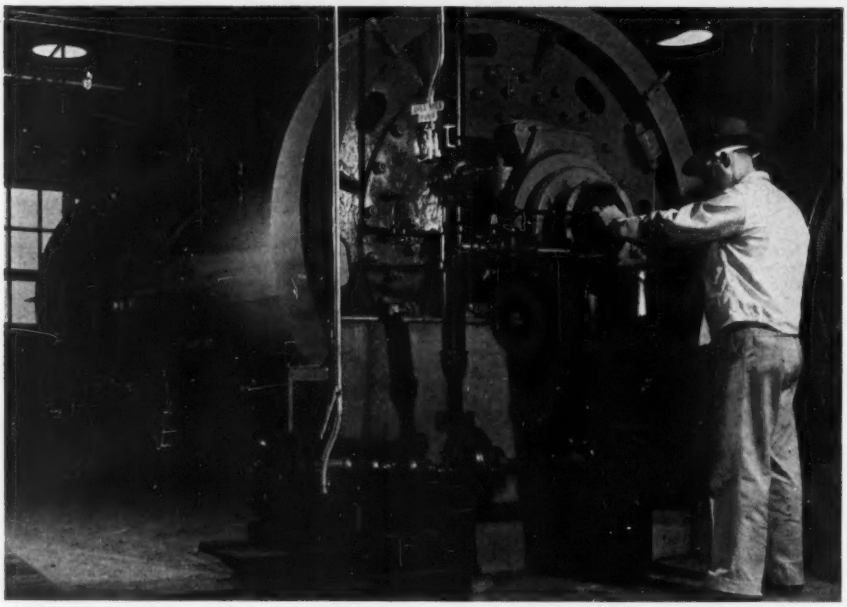
In the new combination process, this



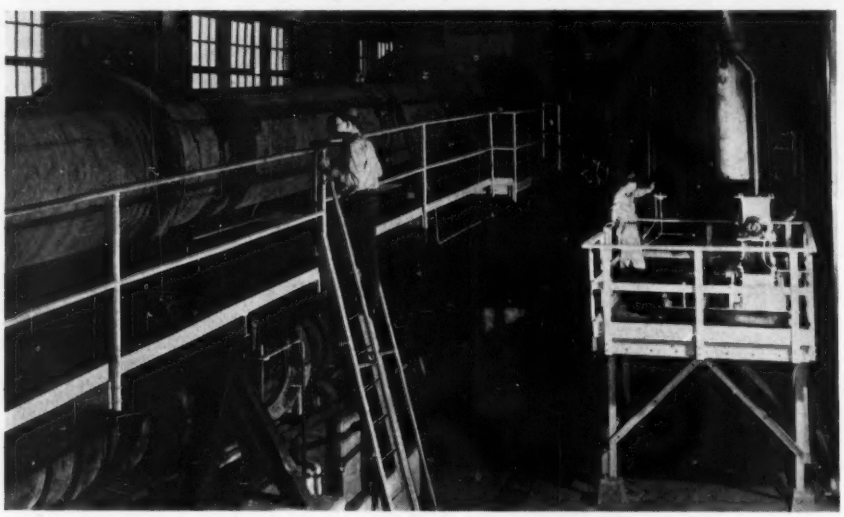
For separating solids from liquids, a small Kelly filter press is employed which reproduces the action of the large filter press in separating "red mud" from sodium aluminate liquor.



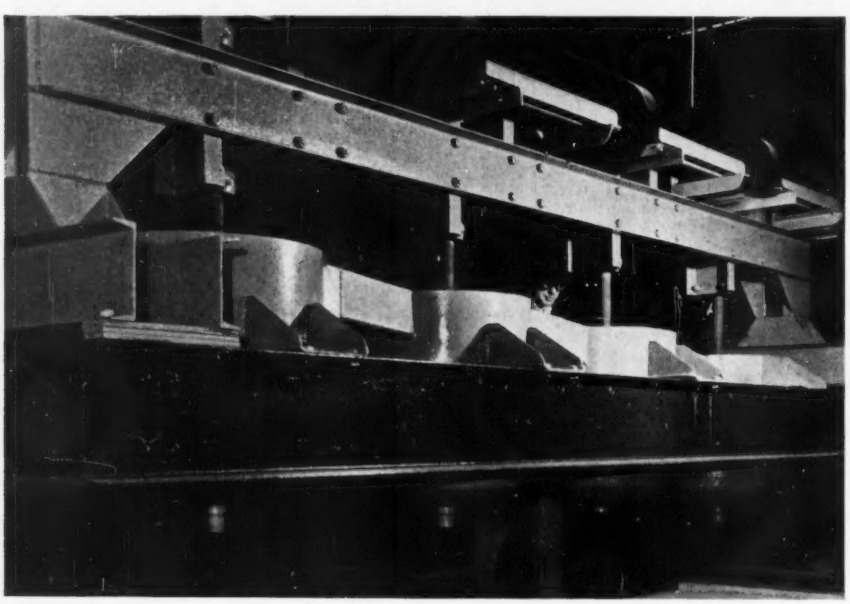
This unit is a small-scale aluminum hydrate precipitator. Sodium aluminate liquor enters the tanks at the top and the slurried precipitate is pumped from the bottom to filters.



Two-compartment Traylor steel ball mill for wet grinding the kiln feed to proper fineness. This unit, too, is a small-scale edition of the ball mills used in the main plant.



An experimental kiln unit used for many testing purposes, including sintering of "red mud" slurry. Kiln is at top, with water spray cooler below. At right is sinter crushing unit.



A small-scale model of a continuous leacher for leaching sodium aluminate and caustic soda out of "red mud" sinter. In the Alcoa combination process, these go back into the process.

"red mud" is sintered with lime and soda, after which it is leached and the leach liquors put back into the digester at the start of the Bayer process. An outline of the process is shown in the accompanying flowsheet. The operations, in somewhat more detail, are as follows:

Process Details

The low-grade bauxite is digested with caustic soda solution under pressure, as in the Bayer process. Alumina and soda, in amounts corresponding to the silica in the bauxite, are insolubilized and remain in the "red mud." This "red mud" is then mixed with ground limestone and soda ash and sintered in a kiln. The limestone and soda ash are adjusted in amount so that there is a slight excess of lime over that necessary to combine with the silica and a slight excess of soda over that necessary to combine with the alumina. The charge is sintered at a temperature of 1800° to 2000° F.

The soft, friable sinter is then ground and leached with water to produce a solution of sodium aluminate and caustic soda which contains the major part of the alumina and soda which were in the "red mud." After filtering and washing, the residue—now known as "brown mud," to distinguish it from the "red mud"—is run to waste. The filtered solution (which contains sodium aluminate and caustic soda, formed during the sintering operation) is then returned to the digesters.

The clear solution of sodium aluminate from the digesters, obtained by settling and filtration, is sent to the precipitating tanks. Here, by seeding with aluminum trihydrate and by slow cooling and agitation, crystalline aluminum trihydrate is formed. The trihydrate, after filtration and washing, is calcined to produce the pure alumina necessary for electrolytic reduction to aluminum. The spent liquor containing caustic soda and some alumina is returned to the digesters.

By such a cyclic process it is possible to treat high-silica bauxite and recover 85 to 90 per cent or more of the alumina, even though the Bayer process alone effects an ordinary recovery of 80 to 85 per cent from high-grade bauxites and only 70 per cent or less from low-grade bauxites. The process proved itself in the pilot plant stage and is now in commercial operation.

Privately Financed

The cost of the pilot plant and development laboratory was borne by Aluminum Company of America while the four production plants are owned by Defense Plant Corporation. In addition to engineering and scientific development, the Aluminum Company's part in the development of the combination process amounts to approximately one million dollars, a quarter of a million for the pilot plant and three-quarters of a million for the development laboratory.

PLANT OPERATION

MORE STEAM from LESS COAL

This year we fight with coal. Here are some ways chemical plants can get more power and process steam out of less coal.

By R. F. STILWELL
Fuel Engineer,
North American Coal Corp.,
Cleveland, Ohio

WITH all the propaganda (good and bad) with which you have been flooded for the past twenty years, you may laugh at the suggestion that you can reduce your coal consumption. Yet the Solid Fuels Administration for War has virtually said that you are going to have to do just that.

Six hundred twenty-six million tons of bituminous coal will be needed in the current coal year to carry on the war, says the Administration. In 1943 we produced less than 600,000,000 tons, and 1944 has seen further losses of mine manpower.

But even suppose that by some miracle we are lucky enough to get 626,000,000 tons out of the ground. There will still be some mighty tough problems of distribution that we certainly have no assurance will be solved. The swollen iron and steel industry will still need much more good coking coal than it can get out of its own "captive" mines, and it is going to get it from commercial mines—just the kind of high-grade, low ash, low sulfur coal many industrials have long preferred for steam generation. Some industrial plants are simply going to have to burn coal of lower heating value, higher ash and higher sulfur than normal.

On top of this is the substantial possibility that demands for coal for military operations and occupations abroad will be upped even further. And finally, there are always such unpredictables as the weather, hauling facilities, etc.

After everybody has done his best (let's hope) in digging and distributing coal, the only thing left is to save what we can—and that brings us back to the purpose of this article: to offer some practical, working suggestions on how industrial power plants can further reduce their coal consumption and still meet steam requirements.

Ways to Save

There are few industrials, big or little, who cannot further improve steam-generating efficiency, and reduce steam consumption, without buying new equipment or worrying too much about what coal they are burning.

After 20 years' experience, making surveys and testing coal in hundreds of power and heating plants in the eastern half of the United States, I am convinced

the coal consumption of the average plant is 5 to 10% higher than the equipment would warrant. Nationally that's a lot of coal, and saving a small fraction of it would come to many millions of tons a year.

That's why you should follow your coal right through from the car on the track to the heat units in the stack to see where it all goes and what can be done about it.

If you have to help the war effort by burning a higher ash, lower Btu, or higher sulphur coal, or if the ashsoftening temperature is higher or lower than you'd like, see what horse sense and "know-how" can do. Before you say it can't be done, try changing your stoker feed rate and the secondary ram adjustment. Try changing fan air pressure and uptake damper position.

Now that you're on high-ash coal, doesn't it sound reasonable that you should clean fires more often? Maybe the boiler and stoker need repair parts or cleaning. Perhaps the boiler-plant steam requirement itself can be reduced.

See whether overloading troubles can't be eased by better load distribution and trimming peak load requirements. To avoid slagging difficulties, don't pile burning coal against furnace walls. Try more air, and experiment with various thicknesses of fuel beds.

Burner Location

Perhaps your soot blowers need repairing, or are in the wrong location. Check the fineness of your pulverized coal, if that's what you're burning. Perhaps you can grind it finer and still have the required mill capacity. Perhaps the burner location can be changed without too much expense. There are literally hundreds of things you can do, and you know your plant better than anyone else.

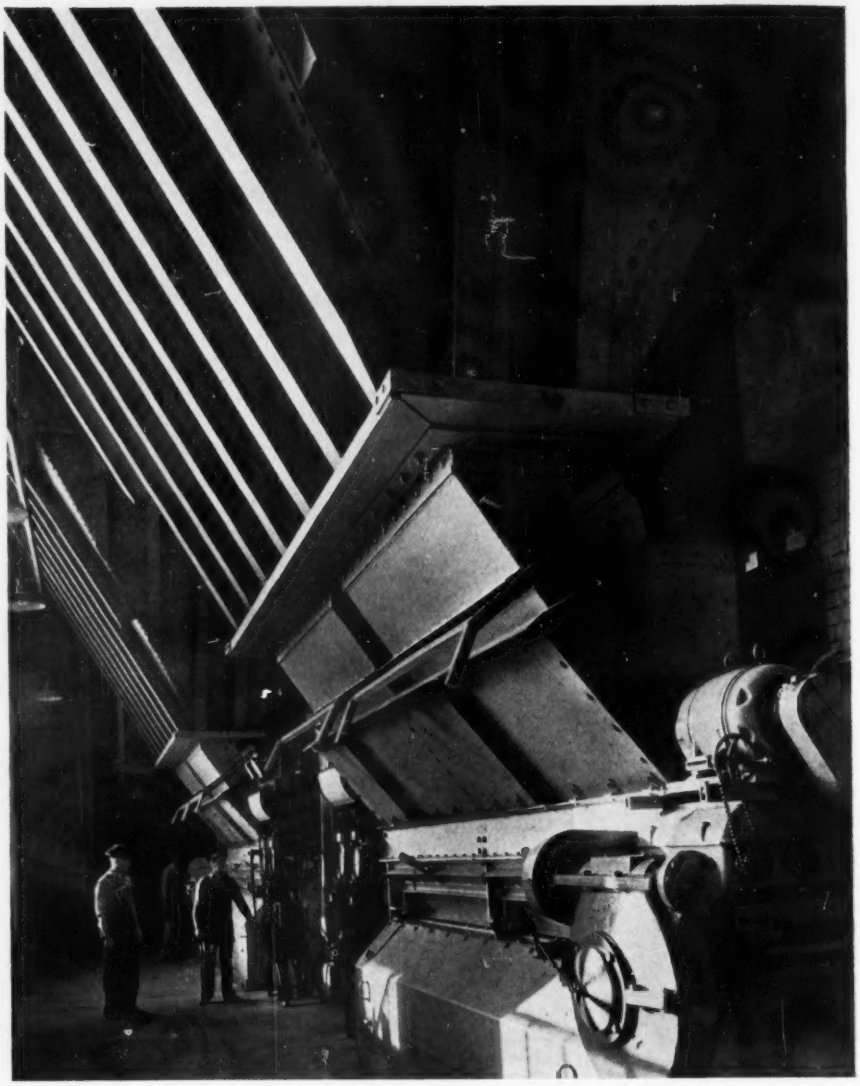
Not all operators realize that the higher ash and sulphur coal can often be burned as efficiently, and sometimes more efficiently, than a coal of "better" analysis. And steam costs may be considerably lower.

Following are specific suggestions for saving coal:

Unloading Cars: Be sure that coal cars are really empty when returned to the railroad. I have seen as much as a ton of coal sent right back to the mine in an "empty" car. Perhaps it was frozen in transit. If so, a little extra work or calcium chloride would have paid handsomely.

Avoid Segregation: Avoid segregation of the coarse and fine pieces of coal in unloading and handling. Segregation reduces efficiency with all types of stokers, particularly with traveling grate stokers. When a "good coal" is segregated it becomes a "poor coal."

To reduce the segregation in round bins and silos make a ladder or spreader out of scrap wood or iron. Always keep long overhead bins as full as possible all the time. Fill them in horizontal layers if possible. If the fireman uses a traveling lorry to fill hoppers, tell him to take coal uniformly along the length of overhead bins. Repair holes in conveyor pans so that fine coal does not accumulate in one place in the bin. Remember that finer sized nut and slack coals do not segregate in handling as much as the coarser sizes.



Coal hoppers and stokers in the St. Louis power plant of Monsanto Chemical Co.

Coal Storage

Store Carefully: Don't store more coal than you need or can handle safely. Remember it costs anywhere from 25 cents to $1 per ton to store coal and then reclaim it. Nut-and-slack and slack sizes should be stored in layers 3 or 4 ft. thick and each leveled and rolled hard with a bulldozer.

Store on clean, hard, well-drained ground. Don't pile against buildings or fences. Don't store in conical piles if possible to avoid it.

Segregation of coarse and fine coal is a major cause of storage fires. Coarse, double-screened coal, such as nut, stove and egg sizes, should be handled carefully when stored to prevent pockets of fine coal. Here, pile loosely and ventilate as much as possible, *a procedure opposite to that used when storing coal containing fines.*

Storage-pile fires waste thousands of tons of coal annually, yet they are almost always preventable if coal is stored and reclaimed with care. When reclaiming coal from a storage pile, if practicable, cut squarely across the pile, beginning at one end and working toward the other. If hot spots develop remove the hot coal and burn it at once. Check pile temperature frequently for the first 60 days, or until no further temperature rise above 150 to 160 F. is noted.

Get at These Repairs: So much for coal handling. What about state of repair in your plant? I know it's been hard to get enough men to run the plant, but wouldn't the men you have get along fairly well if you make a few necessary repairs and reduce the load on your equipment?

How much coal are you losing through burned-out, warped or loose grate bars and dump plates? The direct loss in un-

burned coal may be small, but the heat lost by excess air through these grates may be very large, overloading your stokers and fans. And this, in turn makes extra work for fireman and repair crew. Also, it wastes more coal.

How long since you inspected your boiler baffling? Broken, loose or improperly designed baffling is a major cause of low boiler efficiency and inadequate capacity.

Horrible Example

Strange things happen. For example, I was testing coal recently in a paper-mill plant when a boiler blowdown line burned off near the drum, burning the fireman and putting the boiler out of service for a week. Inspection showed that some brick came loose between the bridgewall and drum, short-circuiting the flue gas under the drum and burning off the blowdown line in which some scale had lodged. In this boiler setting it was difficult to spot the hole in the brickwork while the boiler was operating.

When this boiler was down three other boilers, already heavily loaded, had to carry a third more load to keep the mill running. Resulting coal waste was $50 a day.

There's a moral to this story: You should be able to see and inspect every part of the boiler brickwork and baffles while the unit is operating. A few extra inspection holes (if doors cannot be purchased) can be plugged, and may be the means of keeping your boiler in service and saving a lot of coal.

These holes may be needed for operating a steam or water lance, or for knocking slag off tubes, if you are now using coal of lower ash-fusing temperature.

It's too bad engineers who install boiler plants sometimes forget that someone has to run them. Sometimes the top brickwork must be removed to replace a top circulating tube, or maybe the whole side of the powerhouse has to be knocked out when a straight boiler tube fails. Similar oversights occur in regard to inspection doors and the location of baffles.

Now I'm not trying to say you should punch your boiler brickwork full of holes. In fact, all cracks and air leaks around doors, columns, drums, headers, etc., should be tightly sealed. Cleanout doors that are not needed should be repositioned so they can be of value. And be sure to seal the original opening tight.

The Worst Sin Is Low CO_2: Now let's get to the good old subject of low CO_2, sure sign that boiler efficiency is on the rocks. Low CO_2 percentage in the flue gas is common in many industrial plants.

For present purposes, Table I gives the total stack loss for various flue temperatures and CO_2 percentages, on the assumption that no CO is produced and that no carbon is lost as coke in the ash, or as soot, or up the stack.

Watch Stack Loss

Aside from a water glass and steam-pressure gage, the most important instruments for any boiler are those that measure flue temperature and analyze gas. Every plant, no matter how small, should have at least a thermometer or pyrometer measuring flue-gas temperature and a hand Orsat for analyzing flue gas. The Orsat spots holes in grates, in the fire, or in the boiler setting. Without it there is no way to determine the correct damper setting and fan speed.

The flue-gas temperature spots leaky baffles, plugged heater or superheater tube banks and dirty boiler tubes.

In Table I, pick the coal most like the one you are using and note the effect of reducing your flue temperature 100 F. Next, try increasing the CO_2 content of the flue gas 2% at the same time. The difference is a direct increase in boiler efficiency. More important, it is a direct saving of coal. If you burn 100 tons of coal per day, at 70% over-all boiler efficiency, you really use only 70 tons; the other 30 tons are wasted. Now if you could increase this boiler efficiency to 75% you would use 75 tons, and waste only 25 tons, or you would save five tons per day.

Such an improvement is possible in a great many plants. You may be able to operate your boiler efficiently without a steam-flow meter or coal scale, as long as you have to pay for coal on railroad or truck weight anyway, but you are only kidding yourself if you try to get along without a periodic check-up on flue-gas temperature and analysis.

Use Meters & Gages: A plant large enough to justify a steam-flow meter and a means for weighing coal should have them because they often point the way to a saving in steam consumption outside the boiler room, while providing the means for a daily record of various operations.

Another thing every plant should have is draft gages. They aren't expensive. After proper adjustment by an Orsat, they tell the fireman a lot about his fire, slag on tubes, holes in baffles, loose or broken dampers, fan condition, speed, etc.

Coke in the ashpit (when traveling grates or underfeed stokers are used) or in the flyash (when spreader stokers or pulverizers are used) is another serious coal waste which many plants could reduce. First principle is to clean fires when they need it—not by the clock. Obviously, higher ash coals need more frequent cleaning. Fires should be burned down, but periods between cleaning should not be too long, or excess-air loss will be much greater than that due to coke in the ashpit.

Yet Table 2 shows that coke losses aren't as serious as those caused by excess air. In terms of total heat in coal, 30% combustible in the ashpit refuse is relatively small. Good operation usually keeps the combustible below this figure with almost any equipment burning suitable coal at a fairly high rate.

Ash Troubles

When burning a low-fusing ash coal, too much time between cleaning causes clinkers to stick tightly to grates and furnace walls. Then when the fires are cleaned large lumps of coal fall into the ashpit. Don't pull clinkers off under-feed stoker grates before lifting the dump plates. Keep fires away from sidewalls when possible.

Sometimes a homemade water cooling system is used along the clinker line effectively. One system is a series of jets projecting through the furnace walls at

Table 1—Heat Loss in Flue Gas, Per Cent

Including losses with varying amounts of excess air and moisture and hydrogen losses for high- and low-moisture, high-volatile bituminous coal.

Excess air %	CO_2 %	Illinois Coal Flue gas temperature 300F	400F	500F	600F	700F	West Virginia Coal Flue gas temperature 300F	400F	500F	600F	700F
125	8	14.5	19.0	23.5	28.0	33.0	13.5	18.0	22.5	27.0	32.0
100	9	13.5	18.0	22.0	26.0	30.0	12.5	17.0	21.0	25.0	29.0
80	10	12.5	16.5	20.0	23.5	27.5	11.5	15.5	19.0	22.5	26.5
65	11	12.0	15.5	18.5	22.5	25.5	11.0	14.5	17.5	21.5	24.5
50	12	11.5	14.5	17.5	21.0	24.5	10.5	13.5	16.5	20.0	23.5
40	13	11.0	13.5	16.5	20.0	23.0	10.0	12.5	15.5	19.0	22.0
30	14	10.5	13.0	16.0	19.0	22.0	9.5	12.0	15.0	18.0	21.0
25	15	10.0	12.5	15.5	18.5	21.0	9.0	11.5	14.5	17.5	20.0
Moisture & hydrogen losses alone, %		4.7	4.9	5.1	5.3	5.5	3.7	3.9	4.1	4.3	4.5

This table assumes all carbon in the coal burned, no CO in the gas and no carbon lost as coke in the ash or as soot. Where the carbon lost in the ash and refuse is under 4% of the total heat loss, this table is accurate within about 2%, assuming absence of CO in the flue gas.

Table 2—Heat Loss Due to Combustible in Ash and Refuse, Per Cent

Ash in Coal %	Illinois Coal (68% carbon) Combustible in refuse 10%	20%	30%	40%	50%	W. Virginia Coal (79% carbon) Combustible in refuse 10%	20%	30%	40%	50%
.05	0.7	1.5	2.6	4.0	6.0	0.6	1.3	2.3	3.5	5.3
.06	0.8	1.8	3.0	4.8	7.2	0.7	1.6	2.7	4.0	6.3
.07	0.9	2.1	3.6	5.6	8.4	0.8	1.8	3.2	4.9	7.4
.08	1.1	2.4	4.1	6.4	9.6	0.9	2.1	3.6	5.6	8.4
.09	1.2	2.7	4.7	7.2	10.8	1.0	2.4	4.0	6.3	9.1
.10	1.3	3.0	5.1	8.0	12.0	1.2	2.6	4.5	7.0	10.5

6-in. to 12-in. spacing. From these, small streams of water trickle into the ashpit.

Exhaust steam blown into the ashpit is effective in preventing clinkers sticking to grates and dump plates in over-feed as well as under-feed stokers. Clinkering is a major cause of high ashpit loss. Loose, broken or warped grate bars are another cause.

Other important causes of high ashpit losses on traveling-grate stokers are segregation of coarse and fine coal, and coking characteristics of coal. Freer burning coals give lower ashpit losses. Often, adding water to coking coals improves both boiler capacity and efficiency by reducing ashpit and excess air losses.

Some years ago I spent much time experimenting with a low volatile coking coal on traveling grate stokers in New England. I found that by adding from 6 to 8% free moisture to this coal (⅜ x 0" slack) ashpit losses were cut in half with a marked increase in over-all efficiency.

With spreader stokers there may be a lot of carbon in the flyash. This carbon loss is apt to be higher in a lower ash strong-coking coal than in a higher ash free-burning coal. Steam jets properly placed in the furnace have been known to reduce materially the carbon in the flyash.

Carbon loss in the flyash from pulverized-coal-burning plants is largely a function of the fineness of the pulverization. Grind coal as fine as possible. Keep pulverizer in good repair, and avoid secondary combustion in tube banks. If possible keep the flame in the furnace.

What About Smoke?

Smoke is more of a nuisance than a waste of coal unless it is accompanied by CO in the flue gas. On the other hand, smoke is a good indication that CO is present and the gas should be analyzed for it. Even small percentages of CO reduce the boiler efficiency greatly, as shown in Table 3.

The CO_2 content of the gas should not be raised beyond the point where CO can be detected with the Orsat. Smoke itself is finely divided particles of carbon and ash. Smoke should be avoided, and in many cities this is required by law, yet remember that a clear stack may be wasting much larger quantities of coal than a smoky one. (Again refer to Table 3.)

There isn't time here to discuss feedwater treatment, but you know that the thinnest coating of scale greatly reduces boiler efficiency and capacity. How much time and labor are you losing by cutting out boilers for scale removal? Are you sure you are using a good water-treating agent? If you have any scale at all you'd better have your raw and treated water tested so that the best treatment can be determined.

So far we have shown how to use less coal to make a given amount of steam. Now how about saving steam to save still more coal? Easiest shortcut is to use exhaust steam for heating boiler feedwater. For every 11 deg. F that you raise feedwater temperature you reduce coal consumption 1% if you heat the water with exhaust steam that would otherwise be wasted.

SAVE STEAM
to
SAVE COAL

Coal is one of our most acute war shortages this winter. As large users of process steam, chemical plants are in a position to help the situation by practicing maximum heat economy at all times. An article on ways and means of conserving steam in the plant will appear in an early issue.

Application Savings

Use all the hot water returns you possibly can from heating systems and process. It may not be hard to increase the feed temperature from 10 to 25 deg. and that means saving half a ton of coal to a ton on every 50-ton car you burn. Sometimes, to use that additional temperature it may be necessary to raise the feedwater heater another 5 to 10 ft. above the feed pump. If you have more exhaust steam than you use for heating water or buildings, perhaps you can save by replacing a steam-driven pump or stoker engine with a motor.

Lubricate all machinery to save coal and save machinery as well. In some older factories, as much as 40 to 50% of the fuel for power is wasted in friction.

Stop all steam leaks. At 100-psi pressure a 3/32 in. hole wastes 15 tons of coal a year.

Out in the plant perhaps that cooker, dryer or digester needs overhauling. It may be using too much steam. Check steam traps regularly; they may be leaking and some usually are. Some may be plugged, letting wet steam into your engines.

Check all steam and hot-water piping systems, heaters, pumps, soot blowers, blowdown valves, pump packing glands and safety valves. You may be wasting several tons of coal each month into thin air.

Are your steam pipes properly covered? Is covering tight? Repair loose or damaged covering.

Does your turbine condenser show the proper vacuum? Is condenser tight and are tubes clean? Are exhauster pump or jets in working order? If not, they may waste a lot of coal.

Tests of steam turbines show a decrease in steam consumption of about 5% for each inch of vacuum between 25 and 27 in., 6% between 27 and 28 in., and 8 to 12% between 28 and 29 in. Suppose you have an 800-hp turbine using about 10,000 lb. of steam per hr. at 28-in. vacuum. If the vacuum drops to 25 in., this machine uses about 1600 lb. more steam per hour, which requires 160 lb. more coal at a 10-lb. evaporation rate. Cleaning condenser tubes is a tough job sometimes, but you cannot afford not to keep them clean.

Many plants operating reciprocating engines have not indicated the engines for proper valve setting for years. Many of these engines are using from 25 to 50% more steam than they should. The writer has personally checked several such cases. They should be indicated and the valves properly adjusted and repaired, or replaced when necessary.

Study your plant load. Peak loads require a lot more coal. Study steam consumption and operating schedules of all machinery in engine room and factory. Enlist the aid of the factory manager and foreman in working out an operating schedule that gives the most uniform steam-flow chart possible. This will save coal, cast iron and steel, and brickwork, as well as a great deal of maintenance labor. Meanwhile steam costs will go down.

Table 3—Carbon Monoxide Loss, Per Cent

Heat losses resulting from CO in flue gas with varying amounts of excess air and CO_2. Illinois and West Virginia high-volatile coal.

Excess Air %	CO_2 in Flue Gas %	Illinois Coal (68% carbon) CO: % 0.25	0.50	1.00	1.50	West Virginia Coal (79% carbon) CO: % 0.25	0.50	1.00	1.50
125	8	1.7	3.3	6.3	9.0	1.7	3.4	6.4	9.1
100	9	1.6	2.9	5.7	8.1	1.6	3.0	5.8	8.2
80	10	1.4	2.7	5.1	7.4	1.4	2.7	5.2	7.6
65	11	1.2	2.4	4.8	6.7	1.2	2.4	4.8	6.9
50	12	1.1	2.2	4.4	6.3	1.1	2.3	4.4	6.4
40	13	1.1	2.1	4.0	5.9	1.1	2.2	4.1	6.0
30	14	1.0	2.0	3.8	5.5	1.0	2.0	3.8	5.6
25	15	.9	1.8	3.5	5.1	1.0	1.8	3.5	5.2

SURPLUS PROPERTY: An Opportunity for Chemical Manufacturers

by LEO BARNES, Director of Economic Research,
Research Institute of America

WAR HAS MADE OUR GOVERNMENT the world's biggest customer, and peace will make it the world's biggest seller. Over a hundred billion dollars' worth of thousands of different items—from aspirin tablets to mile-long war plants—will provide opportunities for manufacturers and distributors of chemicals and chemical plant equipment.

THIS is not the time for reconversion. The need for all-out war production is as great as ever. Even those in charge of our huge supply program, nevertheless, agree that some preliminary attention must be given to the war's-end job of getting surplus stocks and production facilities back into private hands.

Because Congress has passed an especially confusing Surplus Property Law, the government's disposal policy is more up in the air than ever. However, there are certain facts and forces that are already at work shaping policy and action, long before the new Surplus Property Board is functioning at top speed.

The manufacturer and business man must decide pretty soon what their basic attitude toward leftovers will be. The problem has half a dozen angles: To some, war leftovers will be a new business opportunity. To others, they'll be a cheaper source of supply. To still others, they shape up only as a disposal nuisance. To other powerful groups, they loom largest as a disquieting competitive threat. Frequently, a businessman may take one attitude toward one type of leftover and a diametrically opposed position on another. His place in this conflict of interests will fix his slant in reading and using the following recommendations.

Good Time to Organize

Basic significance to business of the new Surplus Disposal Act is that it means a considerable pause in both current disposal activities and—more important—in forward planning for the acute leftover problems that will arise after V-E Day. While all regulations of the Surplus War Property Administration continue in effect until superseded by new regulations of the new Surplus Property Board, SWPA can now issue no additional regulations. Improvement and expansion of the present inadequate surplus disposal set-up will thus have to wait until the new board is functioning. This lull before the storm is a good chance for the business man to get his internal organization in shape for buying, selling or otherwise influencing the surplus market. He should stimulate his purchasing, production and engineering departments to think in terms of leftovers. This means getting and encouraging men with imagination as well as technical training. Many leftover items may at first appear unsuitable for use or resale, but further examination frequently shows that they can be readily adapted. A good recent example is surplus canisters for gas masks. These were generally passed up until someone got the idea of reselling them as mothball containers to hang in closets.

How Much?

The size of the job of surplus disposal has been both exaggerated and minimized. It is easy to do both. Exact figures are frequently unavailable. Then, too, by ignoring the distinction between merchantable and non-merchantable property, and by lumping surpluses located abroad with domestic leftovers, the size of the problem can be more than doubled. In line with these distinctions, a reasonable estimate of the magnitude of the surplus disposal job at the end of the war will start with a total of close to 104 billions, but will wind up with a final figure of 20 billions or less. Here's how it's done, using official government estimates:

(1) Total leftovers of 104 billions break down into 65 billions of materials, components, finished goods and other supplies and 39 billions in plant, facilities, equipment and real estate.

(2) However, of the 65 billions in supplies, 45 billions in combat ordnance and other military items are chalked off as unsalable except as scrap. Of the remaining 20 billions, 10 billions are crossed out because they are located abroad and, under the terms of the Surplus Property Act, can't be imported. This leaves the more manageable total of 10 billions in merchantable supplies located in this country.

(3) Similarly, of the 39 billions in leftover plant facilities and real estate, purely military installations account for 23 billions, leaving 16 billions in industrial property. But only 10 billions of both these categories is figured to be both salable and located in the United States.

(4) All this adds up to approximately 20 billions in all types of leftovers that may be offered for sale in the United States.

These over-all figures serve to indicate only what the *first* impact of war leftovers will be on the economy. Because most economic actions have a "multiplier" effect, the ultimate business repercussions of surplus disposal will probably be much larger than the 20 billion dollar figure suggests.

Who Sells Them?

The Surplus Property Act follows present practice by distinguishing between owning and disposal agencies. There are now eight disposal agencies which sell leftovers that have been declared surplus by owning agencies. However, the latter are still empowered to sell termination leftovers, scrap and salvage, leftovers located outside the U. S. A. in areas where there is no disposal agency representative, and nominal quantities of surpluses—

defined as substantially similar surplus items at one location whose cost (estimated if not known) does not exceed $2500.

Administration of the new Surplus Property Act is not likely to make any drastic changes in the responsibilities of the present disposal agencies.

Here is the present line-up of disposal agencies and the type of surplus property they handle.

(1) *Treasury Department Procurement Division:* Consumer goods (other than food), plus surplus property of all kinds located in Puerto Rico, Hawaii and the Virgin Islands.

(2) *Reconstruction Finance Corporation* (which may act directly or through any of its subsidiary corporations): All capital and producer goods, all real property except that assigned to the Maritime Commission, National Housing Agency and Federal Works Agency; plus surplus property of all kinds located in Alaska.

(3) *Maritime Commission:* All maritime property.

(4) *Navy Department:* Combat ships or naval auxiliaries.

(5) *War Food Administration:* All surplus food.

(6) *National Housing Agency:* Surplus housing property other than that under the control and jurisdiction of the War Department or the Navy Department.

(7) *Federal Works Agency:* Surplus war property of the class of facilities financed through FWA other than those located on the sites of housing projects.

(8) *Foreign Economic Administration:* All surplus property located outside the continental United States, its territories and possessions, except commercial ships of more than 1,000 gross tons.

Practically all chemicals are handled by the RFC. These include heavy and fine chemicals, organics and inorganics, paint materials and the like. Those which are packaged for re-sale are handled by the Treasury Department in accordance with their handling of consumer goods. Agricultural products, such as rosin, terpenes, and oils, are under the jurisdiction of the WFA. Chemical plants, of course, will be disposed of through the Defense Plant Corporation, a subsidiary of RFC.

The manufacturer can get a more specific item-by-item breakdown of the property, materials and products assigned to each disposal agency by examining the Appendix to SWPA Regulation 1. Copies of this commodity breakdown may be obtained by writing to the Government Printing Office in Washington or from regional offices of any of the disposal agencies listed above.

Who'll Get Them?

There is still a way to go before business gets a detailed picture of just how, when and where the government's surplus goods will be released, but the Surplus Property Act contains plenty of clues as to who's going to get favored treatment in obtaining surpluses. In practice, moreover, certain buyers are getting and will get favored treatment—either because of successful application of pressure in the right places at the right time, or simply because a particular surplus situation gives them an advantage.

Regular trade channels are the hardy perennials of surplus disposal. They're to be used as far as practicable. Sales are to be handled so that they won't disrupt normal business. Speculators and promoters are to be barred. Big hitch to this high-minded position is that it's almost impossible to agree on what's "regular" and who's a "speculator." Leftover brokers, already mushrooming all over the country, claim they're in a "regular" line and are beginning to do a thriving business. Then too, it's not hard to glorify speculation as "risk capital." Just as efforts to bar newcomers from reconversion have bogged down, it's equally likely that there'll be plenty of spots in the surplus picture for adventurers. Established business can minimize this development only by discarding its lackadaisical attitude toward surpluses. Many businessmen haven't realized that the best way to overcome the competitive threat of war surpluses is to participate actively either in their disposition or in joint efforts to withhold them from the market.

The speediest outlet for most types of leftovers is distributors, who are, therefore, in a key spot to get favored treatment. They can manage larger quantities and cover larger areas than most manufacturers or retailers. They can usually pay higher prices than manufacturers and, while they must buy below the retail level, only a few large retailers can compete with them in the amount of leftover business they can handle. These are natural economic advantages that place the distributor in "first row center" for leftover disposal.

Big business at all trade levels has a similar objective advantage in acquiring most types of leftovers. It can buy large lots, pay cash easily, move products faster, etc. This preferred position is most glaring in the case of surplus war plants. Obviously, the 20 giant war factories which have cost the government an average of 100 million dollars each aren't going to be tidbits for small firms—despite official statements that these plants will be split up "wherever possible."

Under the dynamic leadership of Maury Maverick, small business is fighting vigorously to overcome this natural head-start of big business. Its pressure has shown results. Small business can count not only on equal rights but, in many cases, preferential treatment. Thus, the Surplus Property Board is required to determine the smallest size in which different types of surpluses may be sold in various areas of the country. Property in each class and area must be sold in a way that will give purchasers of these minimum quantities preference over purchasers of larger amounts.

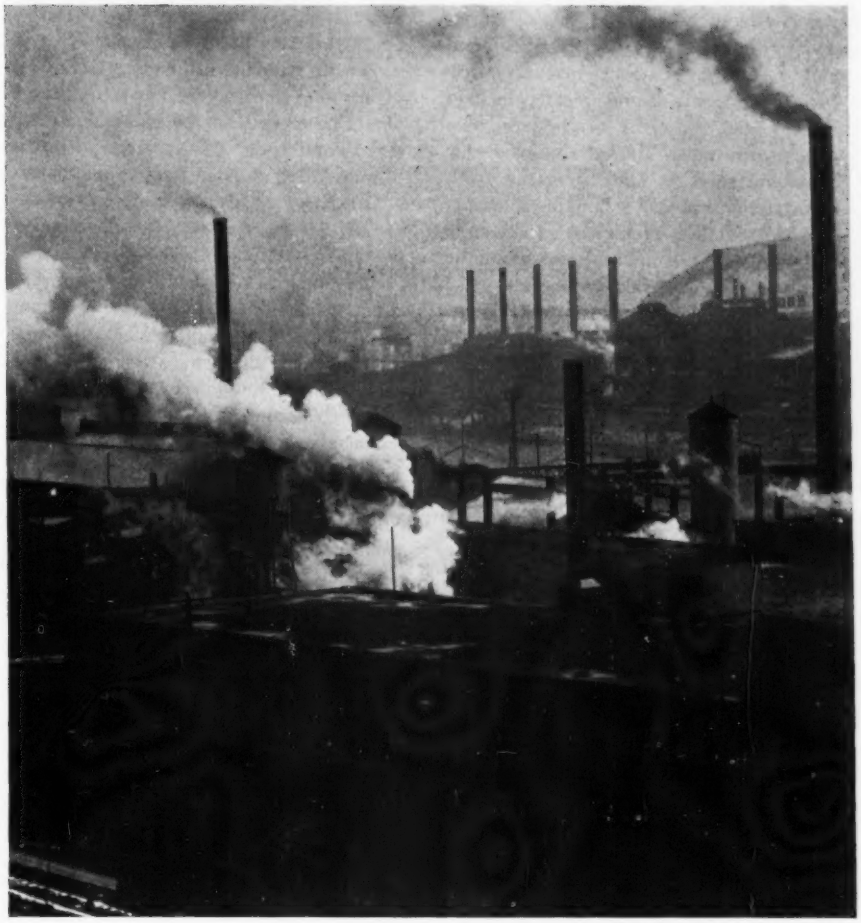
More important, SWPC is specifically empowered to purchase any surplus property for resale (usually in smaller lots) to small business for cash on credit, or in exchange for other property. Such purchases by SWPC are given priority over all types of non-governmental purchases. Similarly, SWPC can make or guarantee loans to small businesses for the acquisition, conversion or operation of plants and facilities which have been determined to be surplus property.

Former owners and tenants get preferential treatment in the disposition of surplus real property acquired by any government agency since 1940. Under the Surplus Property Act, the former owner is entitled to repurchase his property, at either the acquisition price or the current market price, whichever is lower, if it's not required by any federal agency. If the original owner doesn't exercise this option, any tenant at the time of acquisition is next in line. While this provision is intended to benefit farmers primarily, it is also applicable to business property of all kinds.

War Plants

Policies for the sale or lease of surplus war plants are probably more uncertain than those of any other aspect of the disposal problem. The Surplus Property Act accentuates this uncertainty. It makes further delay unavoidable by requiring review of most war plant sales by Congress and the Department of Justice.

Sale or lease of any plant which cost the government $1,000,000 or more must be okayed by the Attorney General. This means that more than 15 billions of the government's 16 billion-dollar investment in war plants will receive Department of Justice anti-monopoly scrutiny. These provisions of the Surplus Property Act should make prospective purchasers move cautiously in buying any war plants until Congressional and Department of Justice policies are clarified. While the decision on purchasing war plants should usually be delayed, there is no need to stop gathering information on what surplus plants are available, or to halt tentative negotiations on properties in which the prospective buyer is interested. A list of plants and plant property owned by the Defense Plant Corporation is now available. This so-called "briefalog" groups plants by states and describes them briefly. It also includes names of the regional representatives who should be contacted if the buyer is interested. For the list, write to Industrial Facilities Section, Defense Plant Corporation, Wash-



With the coming of peace and the subsequent reconversion, the national industrial picture will be greatly changed. What is done with the larger Government-owned plants will not only be decisive in those industries, but will affect the entire economy of postwar America.

ington 25, D. C., or inquire at a local RFC office.

Larger firms buying leftover property of any type and any firm, large or small, engaging in efforts to keep leftovers off the market, should keep a weather eye on the Department of Justice. The Surplus Property Act gives the Attorney General specific additional powers, but does not diminish in any way his blanket authority under existing anti-trust laws. By the terms of the Act, the Attorney General possesses virtual veto power over the disposition of government-owned plants or other property which cost the government $1,000,000 or more and of government-owned patents, processes, techniques or inventions, irrespective of cost.

Negotiated Sales

While negotiated deals, sealed bids and open auctions are all being used in selling leftovers, the tide is running strong in favor of negotiated sales. The Surplus Property Act permits sales to be made without regard to any existing legal provisions for competitive bidding. The law also contains a specific clause releasing disposal officials from personal liability for losses in surplus sales they negotiate in good faith. Fear of personal liability has been the chief reason why government officials were generally inclined to favor sealed bids.

Increased emphasis on negotiation gives buyers of leftovers a better chance to press for legitimate price reductions. Here are some of the bargaining points that can be used: (1) If the manufacture is engaged in war production, sales of leftovers that will help the prosecution of the war can be made very expeditiously at reasonable prices. This will continue to be a very strong point as long as the war lasts. (2) In negotiating a price, the manufacturer should emphasize any freight charges which will have to be absorbed or permit use or resale of the leftovers. (3) For the brokers or distributors, commissions, handling charges or profit allowances necessary to affect disposition are all legitimate bargaining points. (4) If the leftover property isn't likely to be sold or used quickly, the manufacturer shouldn't hesitate to emphasize the cost of storage and amount of depreciation or deterioration involved if the property isn't sold. (5) Similarly, he should be sure to account fully for all his inventory hazards and carrying charges. (6) If he is a distributor or retailer, and plans to offer post-sale services or guarantees when he resells the leftovers, the value of such services should be used as an argument for a price adjustment.

Prices

Determining a fair price for leftovers is a problem that will produce many headaches in the procurement agencies, as well as in SPB and OPA. There are opposing pressures in both government and business. Within the business world, manufacturers of new goods want high prices to kill off competition of leftover products. But business buyers want low prices for profitable use or resale. These opposite attitudes are reflected in the approach of OPA and SPB to the surplus pricing problem. While OPA's primary interest is to set price ceilings to prevent users from overpaying, SPB's chief concern is to set price floors to assure the greatest possible return to the government.

More important than wartime shortages in the long run for maintaining prices are price floors. The Administration is determined to introduce rigid price floors for leftovers if necessary to prevent price depreciation or disorder in the market for specific commodities. The Surplus Property Act itself sets up a definite price floor for surplus farm commodities sold in the U. S. Such commodities may not be sold at prices less than those set up by the Commodity Credit Corporation or current market prices, whichever are higher. This, of course, is classical policy for agriculture. But recently, for the first time the government put a price floor under a substantial portion of the market for an industrial commodity when it placed dollar-and-cents minimums for government disposal of five kinds of aluminum scrap. If pressure similar to that in the aluminum scrap market develops in other commodity fields where government stocks loom large, the same technique is likely to be used.

In addition to price floors and specific pricing rules, a continuance of the general 75% pricing formula now used in setting prices for termination leftovers can be expected. Assumption is that a 25% profit margin isn't sufficient to attract speculators, but is big enough to encourage legitimate distributors, dealers and war contractors to dispose of leftovers. However, it's a good bet that the 75% formula topples by the time hostilities end. One big loophole that exists right now is the permission to sell at less than 75% of cost or market price after a "reasonable" time. The term "reasonable" has been left conveniently undefined so that, if necessary, lower prices can be quickly established. While returns from leftover sales won't hit the low of World War I—35c on the dollar—they'll almost surely be closer to 50% than 75%.

Small lots—so-called nominal quantities worth less than $2500—and leftovers from contract cancellations where the entire termination claim is less than $10,000 be-

fore disposal credits, offer buyers an immediate opportunity for lower prices. For such transactions there is no price floor. They present an excellent opportunity for small business to get leftover materials and products at lower than usual prices.

Guarantee of Merchandise

One knotty problem in selling leftovers is the extent to which merchandise will be guaranteed. While nobody expects that the government will offer a 90- or even a 30-day warranty on items like jeeps, purchasers can legitimately demand: (a) that surplus property be accurately described and classified by disposal agencies, and (b) that the goods when delivered are exactly as described when purchased. If errors in quantity or quality turn up when merchandise is delivered, appropriate adjustments in kind or in price differentials should certainly be permitted. With businessmen in charge of most phases of the surplus disposal set-up, this development is extremely likely. Surplus nomenclature will be modeled on regular trade terms, so that buyers will frequently be able to know what is being offered without visual inspection. Where inspection of goods is necessary, however, it's likely that a system for showing adequate samples of merchandise at regional disposal offices will be worked out.

Limiting the Market

While the policy—first enunciated in the Baruch-Hancock Report—of selling "all you can as soon as you can" will be the rule for most surpluses, there are a number of fields in which this objective cannot be obtained without business dislocation. There are industries in which postwar surpluses will be so large that they could, if released, saturate the market for years to come. Disposal and price policies that are entirely satisfactory for goods in short supply may be definitely ruinous for over-abundant commodities like basic metals and minerals, machine tools and many metal products.

To control this situation the government has available—in addition to the device of price floors previously discussed—three main techniques: (1) stockpiling of "strategic" materials; (2) restricting importation of leftovers; and (3) withholding from the market any surplus not covered by the preceding controls.

(1) *Stockpiling encouraged.* The Surplus Property Act provides for the stockpiling of strategic metals, minerals and other materials. In most cases, such surplus stocks will be frozen for at least a year. The only exception to this rule is that owning agencies shall not transfer to the stockpile any amount of strategic minerals and metals which WPB estimates American industry will need in the next six months for purposes other than war production. To meet this deficiency, owning agencies may dispose of minerals and metals at current market prices. Strategic minerals and metals include: copper, lead, zinc, tin, magnesium, manganese, chromite, nickel, molybdenum, tungsten, mercury, mica, quartz crystals, industrial diamonds, cadmium, fluorspar, cobalt, tantalite, antimony, vanadium, platinum, beryl, graphite (and aluminum or any other minerals or metals which the Army and Navy Munitions Board may determine to be necessary for the stockpile).

It is important to note that the War and Navy Departments have practically unlimited power to add products to the stockpile. They can request that other "strategic" materials in addition to metals and minerals be added to the stockpile. Moreover, strategic metals and minerals are defined broadly to include partially and completely fabricated articles of which the principal components by value consist of such minerals and metals. This offers a loophole by means of which almost all metal products can be stockpiled. Theoretically, to be sure, fabricated articles which may be disposed of at values "substantially" in excess of the metal market price of their component minerals and metals are excluded; but the Act nowhere defines what is meant by "substantially."

(2) *Imports of surpluses restricted.* The Surplus Property Act sets up the policy of prohibiting, so far as feasible, the importation into the United States of surpluses sold abroad or exported.

This policy is enforceable wherever prospective imports are in the same form as the surplus property sold abroad or exported. For example, it is comparatively easy to prevent an army truck sold abroad from returning to the United States. However, it is almost impossible to ban the importation of finished products made abroad from surplus raw materials sold abroad or exported from the U. S. Thus, there is no way of distinguishing from other cotton fabric cloth made abroad from surplus cotton dumped by the U. S. on the world market.

(3) *Withholding surpluses from the market.* The Surplus Property Act marks a shift in the use of government stockpiling from accumulating critical materials in order to meet a shortage to withholding them from the market in order to combat an over-supply. However, the stockpiling provisions of the Act can be made to apply to fabricated products and non-strategic commodities only by an extremely loose construction of their meaning. To withhold such items from the market when desirable, SPB is therefore expected to resort to its general authority to specify the "times at which" leftovers may be sold. Planning is already being conducted by a number of industry groups along the following lines:

(a) *Scrapping of what is not readily adaptable for peacetime use.* In many fields, this may mean all special items not shown in standard catalogues; small lots of any one item where handling charges would be more than the value of the material; and exceptionally large quantities of unusual or unlisted sizes of any type.

(b) *Shipping abroad what can be used for special postwar projects.* Foreign relief and rehabilitation can absorb considerable quantities of many types of leftovers. Since these would, for the most part, be used by non-regular customers, interference with customary foreign markets would be minimized.

(c) *Releasing remaining leftovers into the market gradually.* Depending on the accumulation at the end of the war, it may be desirable that a period of years be taken to dispose of any leftover in order not to depress production and employment in the industries involved.

Advisory Committees

While the Surplus Property Act makes no official provision for the use of Industry Advisory Committees, it is expected that SPB and the disposal agencies will continue to avail themselves of the advice of WPB IAC's, pending the formation of special committees for surplus disposal. There is some Congressional pressure for specific legislation authorizing Industry Advisory Committees to be set up to help determine specific surplus disposal policies. Chances are that the Attorney General will try to circumvent enactment of such legislation by writing a letter to SPB specifying the extent to which IAC's may be used in surplus disposal activities. The immunity of IAC's from anti-trust prosecution covers their surplus disposal activities—as in other fields—only so long as their functions are purely advisory. Committees may not take action on their own initiative on recommendations they have submitted, nor may they try to determine policies for an industry, attempt to compel anyone to comply with any government request or order, or make agreements as to specific industry action.

Plans for withholding surpluses from the market may also be developed by a small number of firms in an industry, rather than on an industry-wide basis. Any such joint action plan should have specific clearance from the Department of Justice. The proposal must be sharply defined and definitely limited in time, make clear how its operations will help smooth reconversion in industry and show that it doesn't exclude competitors or bar new entrants. Pending formation of Industry Advisory Committees by the SPB or disposal agencies, applications for approval should be sent to the neighboring WPB Industry Division. If the War Production Board approves the plan, it will be passed on for clearance with the Department of Justice.

The Synthesis of INDOLES

by ANDREW TREFFLER, Detroit, Mich.

SYNTHETIC INDOLE AND ITS HOMOLOGS hold special interest for perfumers. Described here is a new synthesis of indole, employing aniline and α,β- dichloroethyl ethyl ether, and a review of the best syntheses of α-methylindole and skatole.

BECAUSE OF THE SCARCITY of natural flower oils, the synthesis of indoles is of particular interest to perfumers. The use of these aromatic chemicals enables the expert perfumer to reproduce more closely the odors of natural jasmine or orange flower oils, the odor of many other flower compositions and, with skatole, the odor of civet.

The flower odor, which develops upon dilution with water or blending with other aromatic chemicals, is a characteristic of three different indoles:

	Melting Point	*Boiling Point*
Indole	52.5°	253° (760 mm)
2-Methylindole (α-methylindole)	60.0°	272° (760 mm)
3-Methylindole (β-methylindole skatole)	95.0°	265° (755 mm)

Indole

Many methods are known for the synthesis of indole, but none of these preparations makes the compound very easily obtainable. These syntheses, apparently simple in their reactions, give relatively poor results. This is especially true of reactions which require considerable heat. In the January 1941 issue of *The Givaudanian*, published by Givaudan-Delawanna, Inc., fifteen different syntheses of indole are discussed. The writer experimented with several of these syntheses, but got best results by using a method not discussed in the above reference. This method is based upon the reaction of α,β-dichloroethyl ethyl ether, $CH_2Cl \cdot CHCl \cdot OC_2H_5$, with aniline in the following procedure:

Fifty grams of aniline and 50 gm. of water are heated to boiling, 25 gm. of dichloroether added gradually and heated for one hour. The water and the excess aniline are distilled off, and the residue heated for about 4 hours at 210-230° C. Upon distilling the product with steam, indole passes over and may be purified by conversion into the picrate. During the reaction ethylidene dianiline is formed first, which decomposes at a higher temperature into indole and aniline according to the equation:

$$C_6H_5 \cdot N:CH \cdot CH_2 \cdot NH \cdot C_6H_5 \longrightarrow C_8H_2N + C_6H_5NH_2.$$

Indole crystallizes in leaflets from water, is easily soluble in alcohol, and fairly soluble in hot water. On treatment with aqueous hydrochloric acid it is converted to the hydrochloride of di-indole $(C_8H_7N)_2 \cdot HCl$; boiled with hydrochloric acid it resinifies. Potassium hydroxide reacts with indole at 125° C. to form a potassium salt. In an alcoholic ether solution it forms with $NaHSO_3$ a compound (leaflets from methyl alcohol) from which it is regenerated again by treatment with soda solution. Two well-known color reactions of indole might be reviewed: It produces a cherry red color with a pine splint previously moistened with concentrated HCl; and with sodium nitroprusside and NaOH it produces a deep violet-blue solution.

2-Methylindole

Another indole with a very pronounced flower odor is 2-methylindole. It is prepared best by a method of Emil Fischer: Twenty grams of phenylhydrazine is mixed with 20 cc. of acetone to form the phenylhydrazone. This is heated for about 45 minutes in a boiling water bath. Sixty grams of dry $ZnCl_2$ is then added and the mixture heated at 180° in an oil bath for several minutes. The fused mass is rinsed with 4 times its weight of diluted HCl into a distillation flask, from which the 2-methylindole is steam-distilled. The oil, which crystallizes upon cooling, is dried and recrystallized from petroleum ether.

The reactions are as follows:

$$C_6H_5 \cdot NH \cdot NH_2 + CH_3 \cdot CO \cdot CH_3 \longrightarrow C_6H_4 \cdot NH \cdot N:C(CH_3)(CH_3) + H_2O.$$

$$2C_6H_5 \cdot NH \cdot N:C(CH_3)(CH_3) + ZnCl_2 \longrightarrow 2CH_3 \cdot N \cdot C_8H_6 + ZnCl_2 \cdot 2NH_3.$$

2-Methylindole crystallizes from hot water in the form of spear-like needles. The methyl group decreases its solubility in hot water, but it is easily soluble in alcohol and ether. The solutions in alcohol, chloroform, benzene and ether are violet to blue-green, fluorescent in daylight.

Skatole

Skatole, the most important of the indole homologs, is also best prepared by a method of Emil Fischer:

Ten parts of phenylhydrazine is mixed gradually with 6 parts of propionaldehyde. The mixture is cooled at first and then heated to 180° C. in an oil bath until the water which has been split off during the reaction is completely volatilized.

The propionaldehyde-phenylhydrazone, $C_6H_5 \cdot NH \cdot N:CH \cdot CH_2 \cdot CH_3$, formed by this reaction is a colorless oil which slowly turns red upon exposure to air. By mixing it with the same amount of finely pulverized, dry $ZnCl_2$, 3-methylindole is formed by a brisk reaction which is so highly exothermic that some of the skatole is volatilized and the original brown fused mass turned black. The temperature can be controlled by mixing only small portions of the reagents at a time.

Volatilization can be prevented by using a sublimation tower made from a tube filled with glass wool and set upon the reaction vessel. This precaution will save on material and prevent the escape of nauseating odors. By using a distillation flask as a reaction vessel the skatole can be steam-distilled directly.

The chemical reactions of its synthesis resemble very much the reactions in the synthesis of 2-methylindole and can be expressed in the following equations:

$$C_6H_5 \cdot NH \cdot NH_2 + CH_3 \cdot CH_2 \cdot CHO \longrightarrow C_6H_5 \cdot NH \cdot N:CH \cdot CH_2 \cdot CH_3 + H_2O.$$

$$2C_6H_5 \cdot NH \cdot N:CH \cdot CH_2 \cdot CH_3 + ZnCl_2 \longrightarrow 2CH_3 \cdot C_8H_6 \cdot N: + ZnCl_2 \cdot 2NH_3.$$

The yield is about 72-73 per cent of the theoretical. It crystallizes from ligroin in lustrous white leaflets and has a very intensive and lasting fecal odor. Since it is a decomposition product of protein it has a great affinity for wool and for the skin. The work with skatole, and also to a certain extent with indole, results in unpleasant physiological effects because it increases the blood pressure. Proper ventilation, the use of rubber gloves and aprons, and other precautions are essential for such work.

Skatole dissolves at 16° C. in about 2000 parts of water; in fuming HCl it dissolves only with difficulty to a light yellow solution. It is more volatile with steam than indole. The pine-splint coloration is originally cherry-red, finally violet, and not as sensitive as with indole and 2-methyl indole. Contrary to the usual procedure, the splint has to be saturated first with a heated alcoholic skatole solution and then dipped in cold concentrated HCl.

ORGANIZATION for RESEARCH

by ELMER K. BOLTON, Chemical Director
E. I. Du Pont de Nemours & Company, Wilmington, Del.

In his address accepting the 1945 Perkin Medal from the Society of Chemical Industry on January 5, Dr. Bolton outlined the history and progress of Du Pont research. Among other things he revealed some of the research philosophy and organization which to a large degree have been responsible for the company's consistent record of outstanding chemical achievement. This portion of his address is presented here in condensed form.—EDITORS.

DU PONT'S first formal research laboratory was erected in 1902 for research on explosives. This was one of the first industrial research laboratories in the country and, so far as I know, represented the first organized research effort in the American chemical industry.

For about one hundred years the company manufactured only black powder, dynamite, and smokeless powder, and early research activities were limited to the explosives field. Around the turn of the century, however, manufacturing activities were extended into collateral fields, as, for example, nitrocellulose for non-explosive uses. Research activities were also broadened through the establishment of the Experimental Station in 1903.

This diversification, for the most part, took two forms. By acquiring companies well established in certain lines of business, the company entered the manufacture of such materials as coated fabrics, plastics, paints, varnishes, lacquers, pigments, inorganic chemicals, electrochemical products, ammunition, and guns.

By purchasing patents, processes, and "know-how" from established companies abroad, the company began the manufacture of intermediates and dyes, ammonia, rayon, and cellophane. These two courses obviously reduced to a minimum the time required to start new activities, and saved many years of research effort.

Organization

Du Pont research is decentralized. Each manufacturing department of the company has its own research division. These research divisions are responsible only to the general managers of the departments.

In addition, there is a central Chemical Department, with laboratories at the Experimental Station. This Chemical Department is wholly independent of any manufacturing department, reporting directly to the president and executive committee. Activities of the Chemical Department are chiefly concerned with pioneering-applied and fundamental research. The results of its investigations flow into the research divisions of the manufacturing departments.

It should be emphasized that the Chemical Department, by virtue of its independent position, is not hampered by the daily problems arising from manufacture. The background and experience of our manufacturing departments naturally influence the selection of their new research activities, but with a central Chemical Department, free to investigate any problem in the entire field of chemistry, there is less likelihood of attractive opportunities being neglected because they do not come within the immediate interests of the manufacturing departments.

Fundamental Research

The research activities of the Du Pont Company in normal times fall into three broad categories: improvement of existing processes and products; development of new products; and fundamental research. The latter type has the object of establishing or discovering new scientific facts without regard to immediate commercial use. It is thus distinguished from applied research, which uses previously established scientific facts in the solution of practical problems.

It was felt that university research, while very valuable, was not sufficient to fill the existing gaps in scientific knowledge of importance to the fields of the company. Research was therefore initiated in colloid chemistry, physical chemistry, organic chemistry, and physics.

In order to preserve continuity of effort, the fundamental research group was organized as part of the Chemical Department. Over a period of years, fundamental research has grown steadily, and although relatively small in volume compared to the research activities of our manufacturing departments, it has become one of the most valuable phases in laying the foundation for new lines of applied research.

Policy

A feature of Du Pont research is continuity. The fortunes of a research organization should not follow a profit and loss curve. It is accepted as axiomatic that satisfactory progress in research over a period of years cannot be maintained if research expenditures are materially reduced when business goes through a temporary slump, and increased when business improves. Both neoprene and nylon were "children" of the depression. It is a part of the scheme of Du Pont research to maintain a strong central Chemical Department devoted to long-range investigations.

Still another feature is teamwork—not only on the part of men in a particular laboratory, but also as regards interdepartmental cooperation. The Chemical Department helps to coordinate the research activities of our several manufacturing departments. In order to prevent unnecessary duplication, experience in one department is brought to bear on problems of other departments.

Diversification

In 1916, the Du Pont Company decided to enter the manufacture of dyes, with the encouragement of the Government and representatives of the textile industry. From the beginning it was recognized that the manufacture of dyes could serve as the backbone of a synthetic organic chemical industry. Accordingly, in the early twenties, research was begun on rubber accelerators.

Today the Organic Chemicals Department, in addition to intermediates and dyes, is manufacturing rubber chemicals, petroleum chemicals, tetraethyl lead, synthetic camphor, textile finishes, detergents, wetting agents, seed disinfectants, perfume bases, photographic chemicals, synthetic vitamin D, and many other organic chemicals. Over two thousand materials are now manufactured by this department.

In 1926 Du Pont undertook the fixation of atmospheric nitrogen through the synthesis of ammonia, primarily to supply nitric acid. Through research, methods were perfected for the preparation and purification of the nitrogen-hydrogen mixture, and improved catalysts developed. Also, equipment for use under special and severe operating conditions was designed, and the technique for handling gases under pressures up to 1000 atmospheres, over a wide temperature range, was mastered.

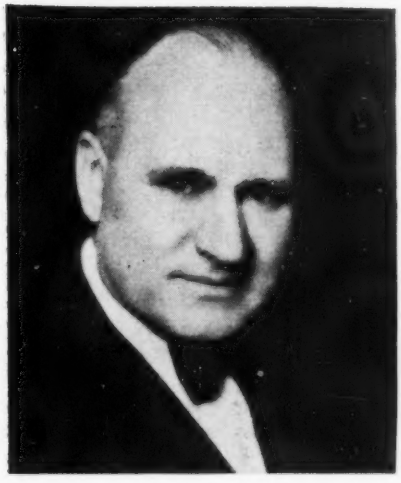
The business of this department was built upon a technology based on the use of water gas. This led to the development of a process for methanol manufacture, and this operation is now carried out on a scale comparable with that for ammonia. Other products of this new technology are adipic acid and hexamethylenediamine—intermediates in nylon manufacture—and ethylene glycol.

Over the past ten years there has been a rapid increase in the number of products made from water gas, including a variety of important ammonia derivatives, aliphatic acids and esters, higher alcohols, and hydrogenated products.

HEADLINERS in the NEWS

GUY L. MARSTERS, vice-president Norwich Pharmacal Co., has been elected Chairman of the Drug, Chemical & Allied Trades Section of the New York Board of Trade.

DR. ARTHUR C. COPE has resigned as associate professor of chemistry in Columbia University to become professor in charge of the organic chemistry division at M.I.T.



DR. ZAY JEFFRIES has been elected vice-president in charge of the recently-organized chemical department of the General Electric Company.

DR. CHARLES F. KETTERING, vice-president of General Motors Corp., has been elected president of the American Association for the Advancement of Science.

COLONEL BRADLEY DEWEY, president of Dewey & Almy Chemical Co., and former rubber director, has been elected president of the American Chemical Society.

DR. VINCENT du VIGNEAUD, of Cornell University Medical School, has been awarded the W. H. Nichols Medal of the New York section of the A. C. S.

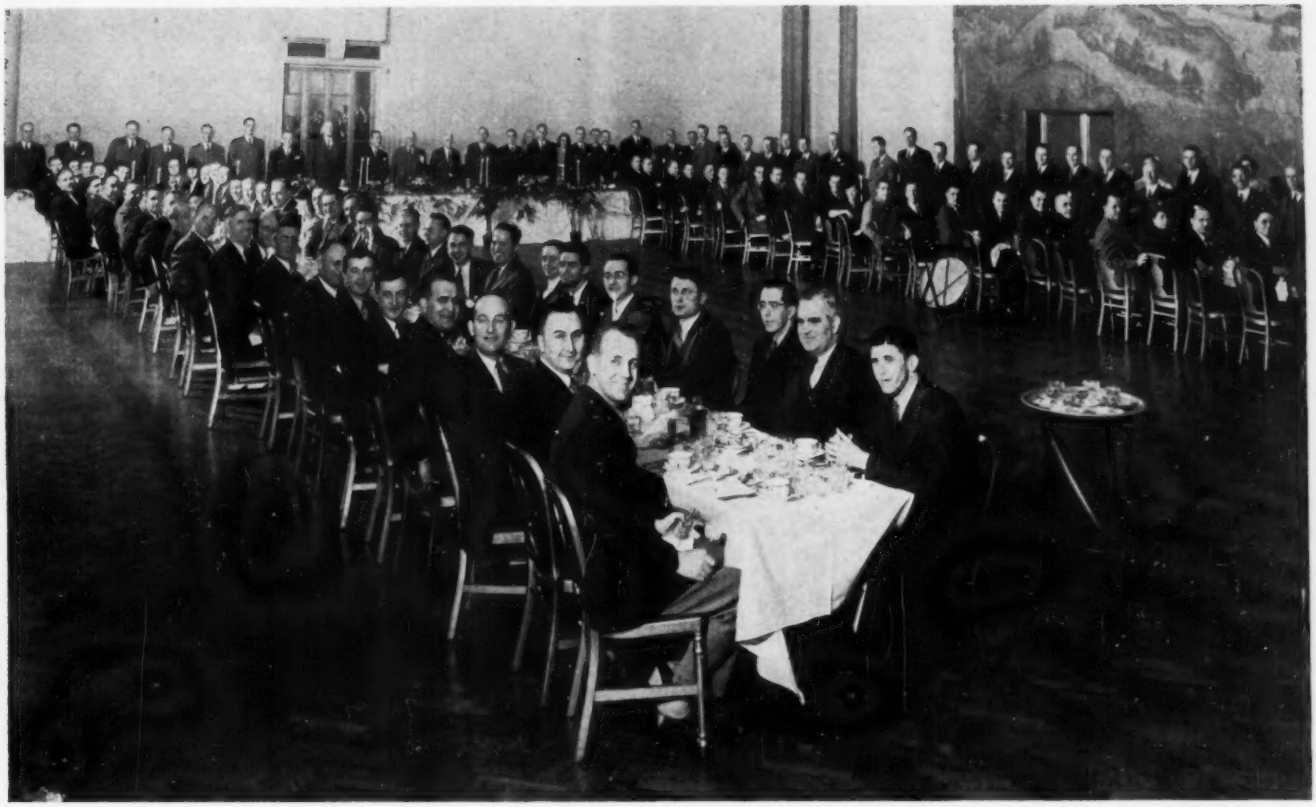
E. A. WILLIFORD, of National Carbon, Inc., has been named vice-president in charge of the Ansco division of the General Aniline and Film Corporation.

THOMAS H. CHILTON, Du Pont Company, is chairman of the Division of Industrial and Engineering Chemistry, which held a symposium at Columbia University, Dec. 29.

Chemical Engineering Symposium

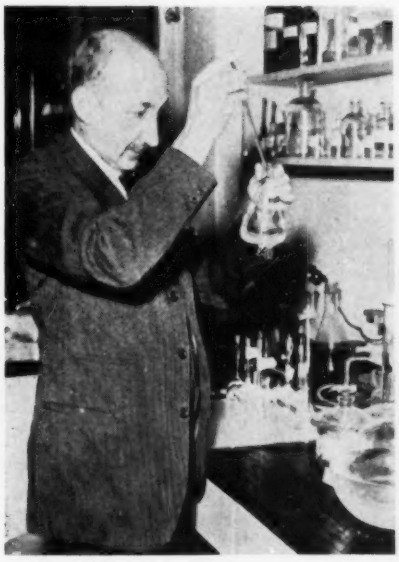
The Division of Industrial and Engineering Chemistry of the American Chemical Society met at Columbia University December 29 to hear papers on adsorption and ion exchange. Above are Thomas H. Chilton and William A. Pardee, chairman and secretary-treasurer of the Division, respectively. Below are Heinz Heinemann, Attapulgus Clay Company, and Ernest W. Thiele, Standard Oil Company of Indiana. At the left from top to bottom are Sterling B. Hendricks, Bureau of Plant Industry; Dr. Charles Wooster, Ciba Company; Dr. P. H. Emmett, Mellon Institute; Dr. Arthur W. Hixson and Thomas B. Drew, Symposium Committee.

Commercial Solvents Research Meeting



The Research and Development Department of Commercial Solvents Corporation met December 7 and 8 in the Terre Haute laboratories. Kenneth H. Hoover, vice-president in charge of research and development, reviewed the projects under investigation during the year, with particular attention to Penicillin. Meetings at which staff members presented reports were conducted by Dr. Jerome Martin, research director. The sessions were concluded by a banquet, at which Major T. P. Walker, president, spoke informally to the staff.

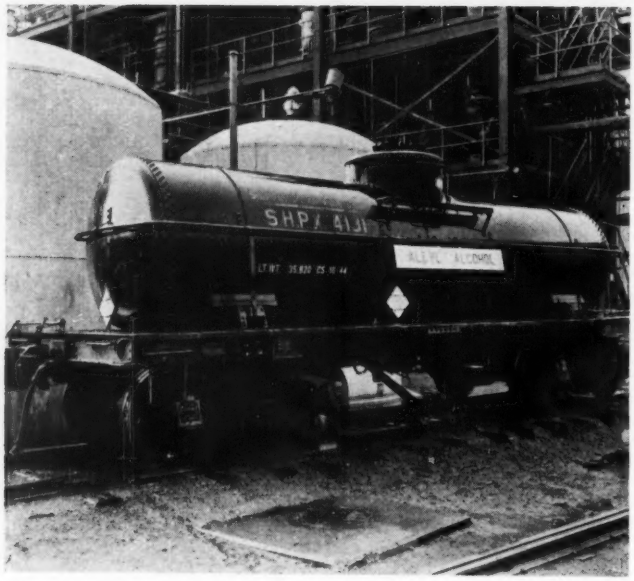
Nobel Award Winner



Professor Georg Hevesy, of Hungary, has been awarded the 1944 Nobel Prize in Chemistry for his work in the use of isotopes. He is now at the University of Stockholm.

Wood Chemists Meet

Present at the recent meeting of the Northeastern Wood Utilization Council were R. S. Aries, field director; J. Sieberlich, University of New Hampshire; Prof. M. Ritzman; C. W. Trayer, Chief, Division of Forest Products, Forest Service, USDA; D. S. Eppelsheimer, University of New Hampshire, and J. A. Hall, principal biochemist, Forest Service, USDA.

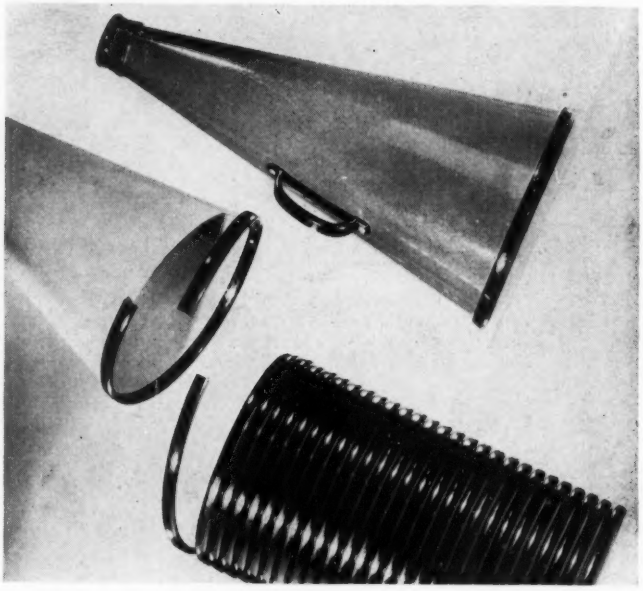


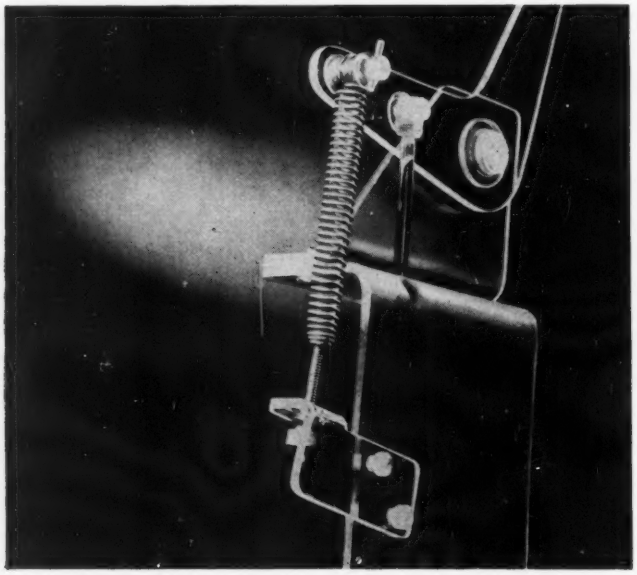
Carload of Allyl Alcohol

Carbide and Carbon Chemicals Corporation recently announced commercial production of allyl alcohol. The first tank-car lot, shown here, left the South Charleston, West Virginia, plant on November 1, 1944. The discovery of a new method of synthesis was developed from test-tube to tank-car in six months, relieving a shortage of the alcohol for use in resin manufacture. The compound can readily be converted into acrolein, propionaldehyde, allyl halides, glycerol chlorohydrin, or glycerol. Its esters polymerize to form useful resins, and the halides are used to introduce the allyl group into barbiturates and as intermediates in the synthesis of cyclopropane.

Tenite Megaphone Rims

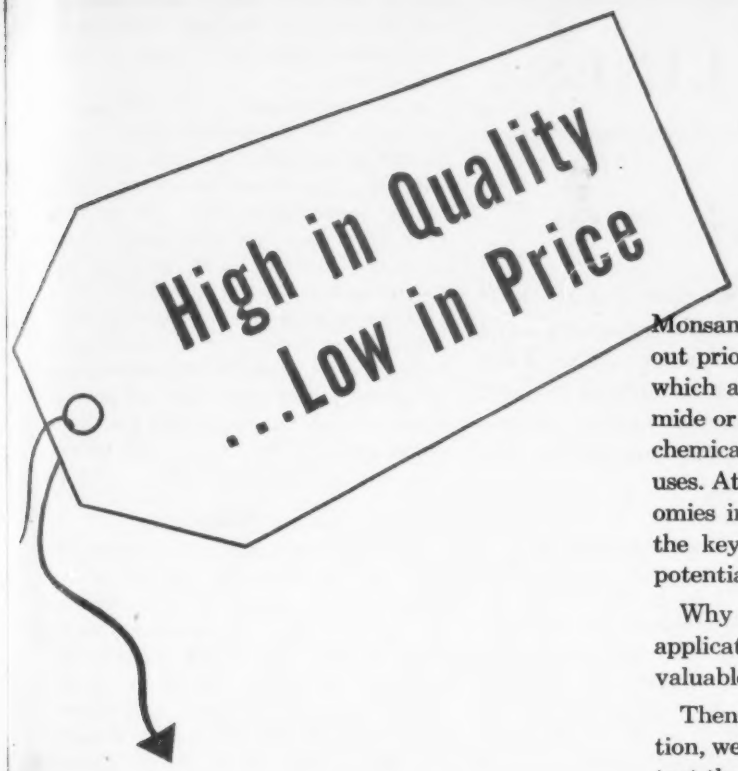
Black Tenite plastic replaces nickel-plated brass for rim, mouthpiece and handle of this Navy megaphone. Rim stock is continuously extruded, coiled by the extruder for storage and shipment, and cut to the desired length by the manufacturer of the megaphone. The rim is extruded in a V-shaped profile into which the paper of the megaphone fits and is fastened with cement. The two ends of the rim are joined by an acetone solution in a bond as permanent as the material itself. Tenite trim such as this requires no further finishing since it comes from the extrusion machine with a high, permanent luster.





Plexiglass Model

This extension spring is a mechanical device for storing a tensile force which either can be used to exert a pull without motion or can be released at any predetermined rate to control the movement of or transfer motion to adjacent parts. The use of Plexiglas, the transparent acrylic plastic developed by the Rohm & Haas Company, in the fabrication of a mechanical model enables engineers to observe the spring from any angle during the measurement of mechanical stresses.



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ESTABLISHED USES

1. In adhesives, principally in hide and bone glues, to prevent jelling at low temperatures.
2. As an intermediate in the manufacture of thioglycolic acid.
3. In the recovery of silver from scrap film.
4. As a preservative for undeveloped blueprint paper.
5. In the manufacture of synthetic resins.
6. As an intermediate in the manufacture of sulfathiozole.
7. In the manufacture of alkyl mercaptans.

These suggested uses are for illustration and are not to be construed as recommending violation of any patent.

POTENTIAL USES

1. For plasticizing ligno-cellulose materials.
2. For the stimulation of seed germination.
3. To improve leveling and working of gloss paints.
4. As an antioxidant.
5. As an intermediate for a wide variety of chemicals.

These suggested uses are for illustration and are not to be construed as recommending violation of any patent.

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BETWEEN THE LINES

Copper--Metals Bellwether?

With a view to aiding small mining interests, the Senate will soon recommend a Bureau of Mines research program on acid ferric sulfate leaching of copper from low-grade ores. This brings to the fore again the question of postwar metals policy. Beclouded by surplus, stockpiles, strengthened foreign competition, and depletion of high-grade ores, the picture is far from clear, but here is some of the thinking.

THE Senate sub-committee on the mining and minerals industry, a part of the Senate committee dealing with postwar small business, will shortly recommend that the Bureau of Mines undertake an exhaustive experimental program in copper hydrometallurgy, in order to demonstrate copper leaching in place by the aid of acid ferric sulfate solutions.

The Bureau has already, during 1924 to 1930, done some developmental work in connection with this process. A certain amount of work has also been carried on in cooperation with Arizona mining companies. As a result it has been established to the satisfaction of engineers participating, that low-grade copper ores could be leached. In the case of certain mine ores, however, leaching required a lengthy period. Some of the subsequent work was devoted to shortening the process sufficiently to make the commercial development of low-grade ores an attractive field for mining companies.

Major Harmon E. Keyes, of the Army Chemical Warfare Service, and formerly a chemical and metallurgical engineer, was a consulting engineer with the Bureau of Mines in this earlier work, and at Committee request he recounted that it required production of a suitable leaching solvent—ferric sulfate and sulfuric acid—at the scene of operations. These experiments were duly covered in a Bureau of Mines report in 1930.

At that time, it appeared that the desired rate of copper production could be maintained by mining only the higher grade sulfide bodies of ore, recovering copper sufide by flotation. The leaching methods evolved in the Bureau experiment were regarded as a probable recourse only when the higher grade ores had been mined out and there had been an accumulation of marginal grade material, such as that found in dumps or stope fillings.

These accumulations of marginal material have now built up. Moreover, the postwar copper price is problematical at this stage. Certain engineering difficulties in production of ferric sulfate and sulfuric acid were uncovered in the early experiments that have now been solved. A small commercial plant producing ferric sulfate, and which may also produce sulfuric acid up to 15 percent strength, is now stated to be successfully operating at a sewage-treatment plant in Phoenix, Ariz.

It appears logical at this time, according to those close to the subject, to consider anew plans for copper extraction which will minimize certain treatment procedure, such as mining, crushing and milling of the ore. Direct extraction of copper ffom dumps, caved areas, and partially worked-out stopes is therefore believed to have interest in connection with marginal grade mines.

Postwar Situation

A relevant aspect of this development has been opened in an entirely different direction however. According to some authorities, postwar mining in the United States will depend very largely on what tariff policies are followed. Copper spokesmen in this country believe in a tariff on imported copper that will support at least a 17-cent price on the domestic metal.

A Senate committee has been engaged for some time in studying the foreign minerals procurement program, so that foreign and domestic costs may be compared. Stockpiling policies also are an influence on any postwar mining operations. Mine interests are greatly concerned as to the postwar disposition of accumulated minerals, metals and other raw materials. A stockpiling bill which would definitely segregate Government metals, including copper, into strategic reserve stocks, available only for military and naval use in an emergency, has been pending for some time.

These factors concern not only the major copper and metals-producing organizations generally, but the small operator as well—the type of small operator who is primarily the one interested in the cheaper copper-leaching process mentioned here.

It has been stated by some authorities that there will be enough copper above ground at the end of the war, which, if added to copper recovered as scrap, would supply rehabilitation needs for from 4 to 5 years. No new metal would need be mined in that period, provided the surplus were so earmarked. Unless some provision is made to remove Government-owned metal surpluses from the market, in short, there would be little inducement to further mining either here or abroad. Keeping old mines open under such conditions, it is said by some mining spokesmen, would be too much risk.

Foreign Competition

Shutting down most of the mines in this country while the surplus is disposed of, it is argued, is no economical way out, since many of these mines would never re-open. One result might be dependency on foreign sources for metals in the future. Furthermore, it is pointed out, American mining cannot compete with the cheaper methods abroad, cheaper because of lower wages and other conditions. At the same time, as a result of the fantastic demands of the war, this foreign industry has been built up to the point where a substantial amount of the potential postwar competition from abroad has been made possible with American money. A surplus production capacity, compared to normal requirements, has evolved.

It is estimated that a certain three copper mines in the United States, all low-cost producers, could supply the peace-time needs of this country, if kept going at war-time pace.

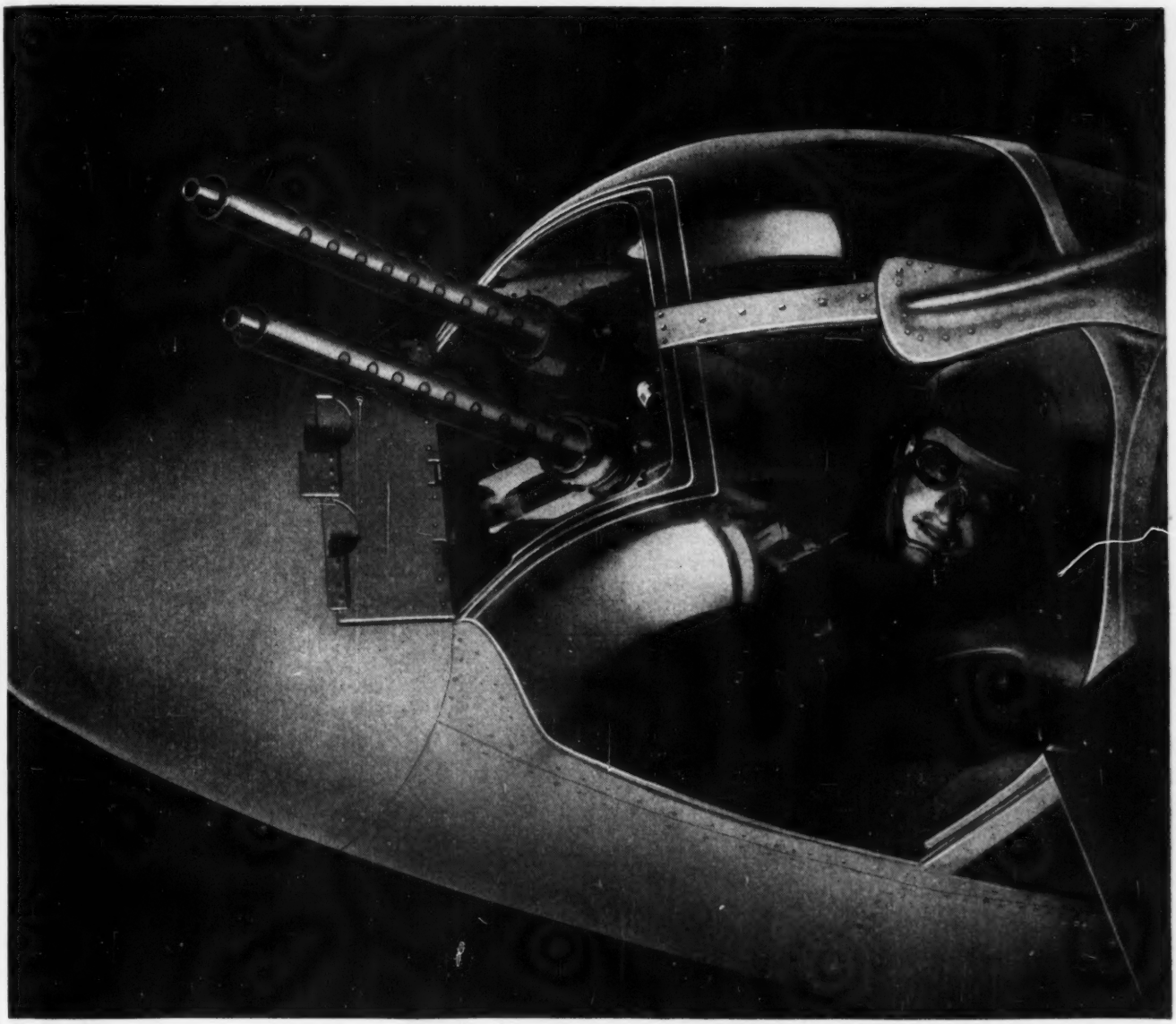
So there are these problems: the stockpile, and its disposal; foreign competition; and home policies. As to foreign competition, the industry apparently is thinking of an exise tax type of tariff, sufficient to equalize the difference between production costs in this country on normal standards, and the traditionally lower output cost abroad. This applies to copper as well as other metals.

All of this bears on the leaching process, and on any other developments in mining that may take place looking to new production levels, techniques, or other processes. As one spokesman put it recently:

"We could not expect the investment of millions of dollars in finding and blocking out new ore bodies, developing new processes, and building new plants for the future sale of a commodity, unless some means is found for a more stable, long-range price and marketing situation than in the past. This is especially true if huge surplus stocks and immense foreign supplies continue to provide a threat to market stability."

P_2O_5

. . . HELPS "BLOW" A PLASTIC BUBBLE



IN WAR as in peace, phosphorus and phosphorus compounds are serving industry. As a condensing agent P_2O_5 plays an important role in the manufacture of methyl methacrylate resins . . . basic material for the clear vision plastic that sheaths the nose and gun turrets of our big bombers. P_2O_5 is also used as a catalyst, as an extremely active drying agent, and as a raw material in the preparation of organic phosphorus compounds such as the alkyl phosphoric acids. Economies in manufacture have brought the price of P_2O_5 down to a point where its use in large scale production is practical.

For years Victor Chemical Works has specialized in phosphates, formates, and oxalates . . . today is the world's leading producer of these compounds. During these years it has been our privilege to help industry solve many important problems with phosphorus compounds, formates and oxalates. May we serve you, too?

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NEW PRODUCTS & PROCESSES

Organic Halides

Two new chemicals, isobutyl bromide and 1-chloro-1-propene, are now being produced by Halogen & Perfume Chemicals. Isobutyl bromide is prepared from the alcohol with sodium bromide and sulfuric acid, a method found to be superior to the usually laborious phosphorous tribromide method. It is clear, water-white, insoluble in water, and distills over a two-degree range.

1-Chloro-1-propene consists of a mixture of *cis* and *trans* isomers and is interesting for research concerning polymerization, aluminum chloride reactions, and other reactions involving the double bond.

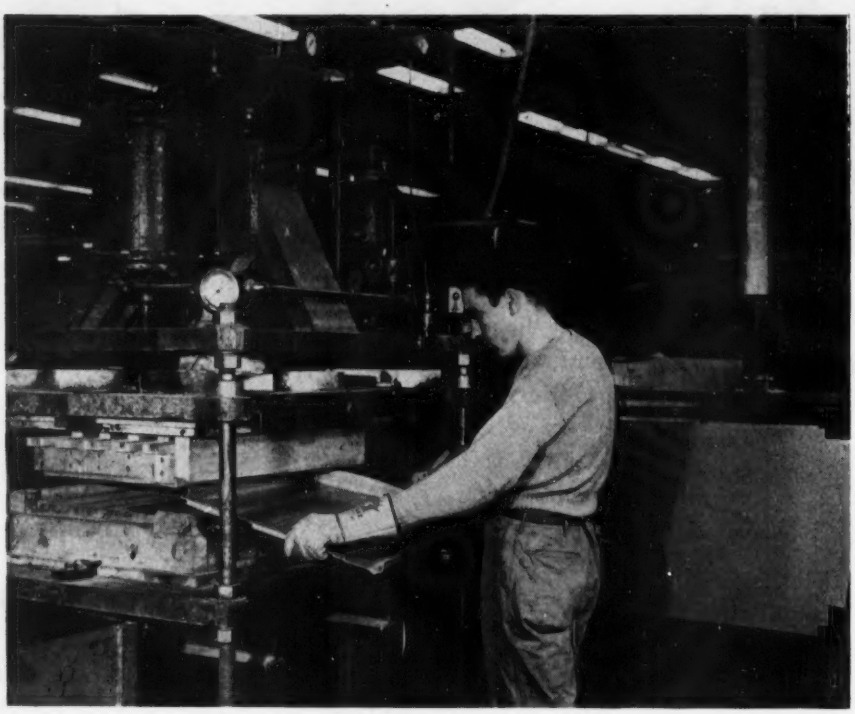
Plastic Laminate

A new Westinghouse plastic, known as Micarta 444, combines the desirable molding properties of thermoplastic materials and the good physical characteristics of thermosetting materials. A modification of the resin in standard Micarta causes the substance to soften when hot, as do thermoplastic materials, but at a much higher temperature—about 300 degrees F, which is far above the service range. Thus the new Micarta can be heated and pressed into deep-drawn and complicated shapes. The pressures are lower—about 50 to 100 pounds—and the times much shorter than required for curing of thermosetting resins. Dies can be made of hard wood or of thermosetting laminates. This makes the manufacture of a relatively small number of parts from a single die economical, as the cost of these parts is not loaded with the distributed cost of an expensive die.

When cool the product has the good strength and freedom from embrittlement characteristic of many thermosetting materials.

Hydroabietyl Alcohol

Production of hydroabietyl alcohol, which is prepared from rosin as a starting material and is described as the alcohol corresponding to abietic acid. was recently announced by the Hercules Powder Co., Wilmington, Delaware. It is reported to offer many possibilities, including use as a plasticizer, resin modifier, tackifier, and adhesive modifier. Hydroabietyl alcohol is a water-white, extremely viscous, sticky, balsamic material, with a softening point of approximately 33° C. It is compatible in all proportions with ethyl cellulose, polyvinyl butyral and polyvinyl chloride. It can be applied in the adhesives field with the water-soluble film-formers, such as casein, zein, etc., to give modified protein adhesives having improved tack, color and stability, while with the non-water-dispersible film-formers it makes up into excellent adhesive formulations of the pressure and-or heat-sensitive types. The addition of hydroabietyl alcohol as a plasticizing resin in milled compositions, such as crude and synthetic rubber or ethyl cellulose, or in molded compositions, such as ethyl cellulose or vinyls, is said to improve the stock.



Micarta 444 being formed in press. It has been used in some aircraft applications replacing aluminum. It has high strength and is not brittle.

Crotonic Acid—First Commercial Production

Shawinigan Chemicals, Ltd., has recently brought into production a "pilot plant" for the commercial manufacture of crotonic acid by a new process developed by its research laboratories. Rated capacity of the unit is placed at approximately 120,000 pounds per annum of the acid.

This development marks the first time in the history of the world's chemical industry that crotonic acid has been made available in tonnage quantities, at basic raw material prices, and opens up a large and unexplored new territory for chemical research.

Crotonic acid, as a four carbon atom, unsaturated carboxylic acid, appears to have many potentially interesting properties, and investigations conducted by Shawinigan and cooperating research organizations suggest several fields worthy of further commercial consideration.

Notable are the possibilities inherent in the copolymerization of crotonic esters with butadiene, vinyl acetate, vinyl chloride and other monomers, as well as the polymerization of pure crotonic esters to form new polymeric substances, similar to the methacrylates. Cellulose tricrotonate, prepared by the esterification of cellulose with crotonic acid, is also said to possess unique properties, as such, or as a mixed ester composition.

The modification of alkyd resins with crotonic acid, for surface coatings, and the preparation of modified ester gum resins for paint formulations are other possibilities, together with the manufacture of drying oils from non-drying oils by crotonic treatment.

Crotonic also has applications in the production of pharmaceuticals, particularly the amino acids, insecticides, plasticizers, and various organic intermediates.

Water Purification

A new process for water purification has been developed by The Mathieson Alkali Works, for the removal of "chlorphenol" taste and odor.

The process consists of pretreatment with chlorine to sterilize the water, followed by treatment with chlorine dioxide to remove taste and odor caused by phenolic waste. The chlorine dioxide is

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A-16

generated by dispensing a sodium chlorite solution into the discharge line of a Wallace and Tiernan chlorinator. A constant dosage of 0.5 ppm available chlorine is maintained, which, it is claimed, is sufficient to remove all taste in a severely contaminated water.

Following experiments with the process on a laboratory scale, plant-scale operations were carried on at an auxiliary filter plant of the City of Niagara Falls Water Department. This plant, which supplies three to eight million gallons of water per day, has an "on-shore" intake which often became so contaminated with phenolic compounds that the customary method of treatment was inadequate. Variations in the degree of contamination aggravated the problem.

Three months of operation with the chlorine dioxide process demonstrated that it destroys phenolic taste and odor permanently and completely. Additional advantages claimed for the process are considerably reduced chemical costs and simplified plant operation. The process is now used for purification of the entire Niagara Falls water supply.

Alkyl Phenols in Rubber Compounding

A patent covering the introduction of a class of materials known as the alkyl phenols into butadiene type synthetic rubber during its compounding, to provide both softness and tackiness in the composition, has been assigned to The B. F. Goodrich Company.

It is pointed out in the invention that while softeners of synthetic rubber had been previously used in compounding the material, they did not provide tack, and that various tackifying solutions had to be later applied to the surface of the composition. Even this treatment did not give satisfactory tack to some compounds.

Incorporation of the materials covered by the patent into the compound is carried out by the conventional factory methods either with the rubber as a solid or in dispersion. Use of the materials reduces the difficulties in handling synthetic rubber in manufacturing processes, such as calendering, extruding or the plying up of successive layers of rubber or rubberized fabric.

Organic Weed-Killer

Tests by the Agricultural Research Administration, U. S. Department of Agriculture, of growth-regulating chemicals promise a means of solving many weed control problems. The compound 2,4-dichlorophenoxyacetic acid is giving surprisingly good results in killing weeds in grass plots, lawns, and pastures without damaging the grasses and also may prove useful against some weeds in grain fields.

Workers in the Bureau of Plant Industry, Soils, and Agricultural Engineering at Beltsville, Md., discovered that water sprays containing this compound killed heavy stands of dandelion and narrowleaf plantain when applied at the rate of 5 gallons to 1,000 square feet of a solution of only one-twentieth of one percent concentration without injury to the grass.

Other weeds readily killed by the compound include pennywort, chickweed, pigweed, wood-sorrel, knotweed, and broadleaf dock. Similar quantities of the spray containing one-tenth of one percent of the compound selectively killed white clover, frequently considered undesirable in golf greens and some lawns.

Well established bluegrass was not injured by this potent new herbicide. The creeping bent grasses were found much less resistant to it but resistant enough to permit the killing of susceptible weeds without being destroyed themselves.

The effect of the 2-4-D acid on the susceptible weeds and clover is much different from that of other chemical herbicides. Instead of producing a local burning effect, say the experimenters, its effect spreads and kills the entire plant, roots and all. The first evidence of injury appears within 24 to 48 hours—a severe twisting and bending of stems and petioles and a gradual yellowing after 10 to 21 days, then browning and death.

For a single application the experimenters used a commercial water-soluble, waxlike "spreader" which facilitates putting the chemical into solution—1¾ pounds of the acid and 9 pounds of the spreader in 225 gallons of water—enough for one acre of grass. At present prices the materials would cost $3 to $5 per acre, but if production of these chemicals were greatly expanded the cost would doubtless be less.

Organic Insecticide

The Geigy Company (Switzerland) has announced another insecticide in the DDT group. This new material, to be known as "Geigy 33," contains an organic contact insecticide which, it is claimed, is absolutely nonpoisonous to man. It is designed primarily for the protection of foodstuffs against attack and for the destruction of insects after foodstuffs have already been infested with them. It is intended for use in stores of cereals, coffee, tea, cocoa, tobacco, malt, dried fruits, and other foodstuffs which are ordinarily prey to various insects.

Large-scale laboratory experiments by the company have shown that such foodstuffs can be protected for many months against the corn weevil, rice weevil, lesser grainborer, saw-toothed grain beetle, flat grain beetle, red flour beetle, yellow meal worm, cadelle (a grain beetle), and silverfish. It is further claimed that neither the appearance nor the cooking capacity of treated cereals suffers from mixture with this product, and that treatment does not alter the temperature of the stored goods.

The firm reports that protection is furnished by a mixture of 1 part of Geigy 33 powder with 1,000 parts of the foodstuffs to be protected and, furthermore, that walls and ceilings of storerooms can be sprayed with 3 parts of the new insecticide in 100 parts water.

Geigy 33 is now available. The firm has offered this new insecticide, which is also being produced by the Geigy Company's branch factory in Spain to the American authorities in that country, where huge stocks of foodstuffs are said to be stored for relief of suffering civilians in Europe.

Waterproof Silica Aerogel

Unlike straight silicia gel, whose principal uses depend on its affinity for water, silicia aerogel must be kept dry if it is to carry out its function as a highly efficient insulating material. Thus it is of interest that Monsanto Chemical Co. this month announced a new "waterproofed" silicia aerogel. The waterproofing agent is an organic silicon compound.

The Monsanto line of silicia aerogels are known as Santocels. The new waterproof Santocel is said to weigh as little as 3 lbs. per cu. ft. and has a thermal conductivity about half that of cork. A fluffy, free-flowing cellular material, it is expected by the company to have application as an insulating material in such postwar items as blankets, sleeping bags, hunter's coats, and refrigerators.

Plating Process For Aluminum

The Enthone Company has announced the development of a new, simple process for preparing aluminum for electroplating. The process is called the "Alumon" process.

It enables electroplating of all types of aluminum including both rack and bulk work. The procedure consists of cleaning the metal in the usual manner and then dipping it in the "Alumon" solution, which produces an active alloy base which can be subsequently copper or silver plated. After the work has been given a short copper plate, it can then be electroplated with other metals including nickel, chromium, gold, etc.

At present it is being widely used for plating of aluminum radar equipment and other apparatus. Work plated by the "Alumon" process can be subjected to severe distortion without flaking and the plate can be readily soldered. A wide interest has developed in the process for postwar plating of such articles as costume jewelry, amulets, pencil points, and household goods.

The process is patented and the user is granted a license with no royalty pay-

DU PONT PRODUCTS YOU SHOULD INVESTIGATE

POLYVINYL ACETATE EMULSIONS

These emulsions are effective adhesives for such materials as wood, paper and other cellulose products, cloth, leather, cork, metals, glass and ceramics. Can be used as binders for paper pulp, sawdust, scrap leather, sand, clay, and other organic and inorganic molding or modeling masses. Suitable as wet-bond or heat-sealing adhesives.

They serve as superior replacements for rubber latex and other essential materials, particularly in the adhesives field. Colorless, durable films, useful as heat-sealing tapes, can be made by evaporation of water.

CHARACTERISTICS
POLYVINYL ACETATE EMULSIONS

Form	Free flowing, milky white liquids
Total Solids	55% minimum
pH	4–6
Color	Milk white
Unpolymerized Vinyl Acetate	Less than 2%
Weight per gallon	Approx. 9 lbs.

FILMS AND COATINGS

Physical Properties	
Form	Tough, resinous solid
Color	Water-white to cloudy
Density	1.19 at 20° C.
Specific volume	23.2 cu. in./lb.
Heat Sealing Temperatures	
RH-460A	125° C. (approx.)
RH-460	100° C. (approx.)
Note: Plasticizers may be used to modify these temperatures.	
Chemical Properties	
Stability to light	Excellent
Burning rate	Slow
Effect of reagents	Hydrolyzed by strong acid or alkali

PROPERTIES

Polyvinyl Acetate Emulsions are available in two grades. Both have the same resin content and viscosity but differ in the softening point (heat sealing temp.) of the contained resin.

The emulsion obviates use of organic solvents and special equipment. It can be diluted as desired by adding water; readily accepts plasticizers, pigments, and other materials commonly used in adhesive, binder and coating formulations.

COMPATIBILITY—Solutions of starch, dextrins, glue, casein and emulsions of asphalt, paraffin wax, rubber, natural and synthetic resins may be added to these Polyvinyl Acetate Emulsions.

Polyvinyl Acetate Emulsions have other properties of interest to paper makers and converters, and to manufacturers of textile sizes, water paints, leather finishes and dressings, and other aqueous preparations requiring an adhesive constituent or binder.

USES AND APPLICATIONS

ADHESIVES—Polyvinyl Acetate Emulsions are used commercially as adhesives for joining textiles, paper, cork, leather, metal, wood, ceramics, etc. Use of heat is not always necessary, but in many instances application of heat during or after drying will increase bond strength. Plasticizers may be used to modify both the tack or initial "grip" of wet or partially dried emulsion coatings. Sealing temperatures and flexibility of the bonding films can also be modified by plasticizers.

Mixtures of Polyvinyl Acetate Emulsions and starch solutions are superior to starch alone in water resistance and strength of final bond.

Adhesives for use in fabricating shoes and other leather products and in food packaging are prepared by simply adding to the diluted emulsions the amount and type of plasticizer necessary to give desired tack and flexibility. In some cases emulsions of other resins or rubber latex are added to meet special requirements.

BINDERS—Paper pulp, wood flour, shredded asbestos, ground cork, textile fibers, sisal fiber, hemp and similar materials may be mixed with diluted emulsion and the resulting plastic mass subjected to heat and pressure to produce sheets, containers, casting molds and cores, reproducing impressions, models, etc., of remarkable strength and durability.

FILMS AND COATINGS—Adherent films of Polyvinyl Acetate may be deposited on wood, cloth, paper, metals, ceramic ware, etc., by coating with emulsion, followed by water evaporation. They are stable to light, oxidation and aging; unaffected by aliphatic hydrocarbons, vegetable oils or animal fats.

★ ★ ★

These emulsions offer a means of extending the established usefulness of Polyvinyl Acetate. They are now under Allocation Order M-300-54, but limited quantities are available for research and experimentation. Further details may be obtained from: Electrochemicals Department, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware.

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ments other than the cost of the salts.

New Plasticizer

Polyethylene glycol di-2-ethylhexoate, called "Flexol" plasticizer 4GO, has been added to the list of ester-type plasticizers offered by Carbide and Carbon Chemicals Corporation, a Unit of Union Carbide and Carbon Corporation. This new plasticizer possesses a very low vapor pressure, is practically insoluble in water, and has a low absolute viscosity. These properties, together with the wide compatibility of the compound, make "Flexol" 4GO a valuable plasticizer for use with lacquers and synthetic elastomers. Technical information on this new product and on other members of the "Flexol" group of plasticizers is available.

This promising plasticizer will be of interest to those working with solution coatings and molded, extruded, or calendered compositions of synthetic rubber and other plastics with which it is compatible. These plastic materials include cellulose nitrate, ethyl cellulose, and the vinyl acetate, vinyl chloride-acetate, and vinyl chloride polymers. The proper performance of articles fashioned by milling or calendering will depend on the use of temperatures high enough to assure good dispersion of the plasticizer. In the case of "Vinylite" resin VYNW, milling temperatures of 300° F. yield a desirable product with good tensile and tear strength, excellent low-temperature flexibility, and good resistance to plasticizer loss.

"Flexol" plasticizer 4GO appears most promising as a plasticizer for synthetic rubber. In Buna N, for example, tests have shown it to be superior in general performance to any other single product tested. Physical properties are good and retention and low-temperature flexibility are excellent.

Compatibility With Various Resins

	Ratio of Resin to Plasticizer		
	1:1	4:1	9:1
Vinyl Chloride-Acetate Resins	C	C	C
Vinyl Butyral Resin	I	I	I
Vinyl Chloride Resin	C	C	C
Vinyl Acetate Resin	I	C	C
Polystyrene	C*	C	C†
Cellulose Nitrate, ¼ sec. R.S.	C	C	C
Ethyl Cellulose	C	C	C
Cellulose Acetate	I	I	I
Methyl Methacrylate	I	C†	C†

C—Compatible
I—Incompatible
*—Soft, sticky film
†—Very little plasticizing action

Physical Properties

Specific Gravity at 20/20°C.	0.9892
Solubility in Water at 20°C.	<0.01%
Solubility of Water in, at 20°C.	1.4%
Viscosity at 20°C.	25.1 centipoises
Flash Point	395°F.
Average Wt. per gal. at 20° C., lb.	8.232

This plasticizer is excellent for use with the vinyl chloride polymers. Its use results in compounds that are not only outstanding in flexibility at low temperatures but in addition are able to withstand severe service conditions without the loss by volatility of appreciable quantities of the plasticizer. The very low vapor pressure of this plasticizer insures low losses during calendering or milling operations and prolongs the service life of plastic articles.

Butadiene Monoxide

A new chemical, butadiene monoxide, a colorless, relatively volatile, liquid organic compound possessing both carbon to carbon unsaturation and an alpha-epoxide group has been announced by the Columbia Chemical Division of the Pittsburgh Plate Glass Company.

The compound undergoes a variety of reactions characteristic of those two organic groups which render it useful in diverse organic processes; for example, in the production of polymerizable alkyd resins, unsaturated alcohol ethers and esters, and other organic chemicals.

Smokeless Powder From Wood Pulp

A new process has been perfected to manufacture smokeless powder from wood pulp, which relieves America of much of its dependence upon cotton linters for the production of nitrocellulose, base material of rifle and cannon powder.

The amount of kraft pulp required to produce enough powder for a single carbine cartridge would make a piece of wrapping paper large enough to wrap up a small lemon.

Experimental lots of kraft pulp, produced by the Western Cartridge Company sulfate process in the plant of the Gaylord Container Corporation at Bogalusa, La., have been successfully nitrated and manufactured into smokeless powder in government plants at Radford, Va., and Charlestown, Ind.

While wood is not a new source of cellulose in the production of nitrocellulose, the new sulfate process permits the use of woods of a lower grade and faster growing type than are now used in the older sulfite process. America has a virtually inexhaustible supply of these types of wood.

The major difference between the two processes is that sulfite pulp is produced by treating wood chips with acids whereas sulfate pulp is produced by treating wood chips with alkalies.

Light-Fast Dyes

Tennessee Eastman Corporation has announced a new series of sunlight-fast acetate dyes. This series, designated as LF, will include reds, greens, blues, oranges, browns, yellows, violets, and pinks.

First in the new series is Eastman Fast Yellow GLF. This dye produces bright shades of neutral yellow on acetate rayon and nylon. Dyed in pastel shades on cellulose acetate rayon, 25- to 40-hour light fastness is obtained; and in heavy shades, light fastness approaches 240 hours. It leaves cotton and viscose rayon white and is good for cross dyeing.

Eastman Fast Violet 5RLF is the second dyestuff in the LF series. An anthraquinone dyestuff, it dyes cellulose acetate a reddish shade of violet which has outstanding fastness to sunlight. A somewhat bluer shade, with good light fastness, is produced on nylon.

Phosphor Deposition

Westinghouse engineers have now found another application for the same electrostatic principle that has been used with great success in the Precipitron: instead of removing dust from where it is not wanted, they are placing dust where it is wanted. The principle is being used to coat fluorescent lamps with phosphors.

The usual method of coating fluorescent tubes has been to suspend the phosphor dusts in a solvent which is allowed to flow through the tube after it has been carefully washed. When the tubes have been flush painted in this manner, they are allowed to dry and are then baked to remove all solvent.

In the new method the tube is slipped over an ionizing wire and a high potential placed between wire and the tube. A smoke of the dry phosphor is made and blown through the tube. The phosphor particles are ionized positively and are driven by the strong electrostatic field to the glass walls where they give up their charge and adhere firmly and permanently to the glass. A subsequent treatment with a blast of moisture-saturated warm air smooths the surface.

The electrostatic method has several advantages, both to the user and to the producer of the lamp. A gain of three to four percent in light efficiency is obtained. This results from the greater uniformity of phosphor distribution. By the new method phosphors are automatically laid on evenly. The ionized dust particles strike the glass, give up their charge, and immediately become insulating, leaving only uncovered areas to attract more dust. By the liquid-flow method, the draining end of the tube, of necessity, gets more phosphors than the upper end. The distribution of the phosphor, therefore, cannot be designed for maximum energy transformation.

With the electrostatic method the tubes do not have to be treated at as high a temperature; this lessens phosphor deterioration.

Tubes now do not have to be washed, as any clinging tiny dirt speck does not show. But with the flow method, a small spot of dirt becomes an island and the eddies of fluid around it leave their mark.

Using dry phosphors eliminates both the problem of handling liquids and the hazard attendant upon volatile solvents.

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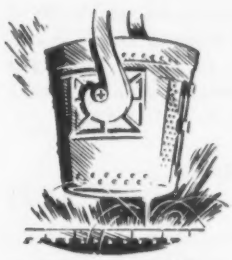
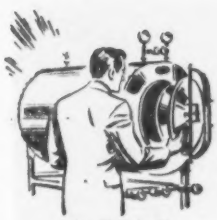
For Educational Laboratories

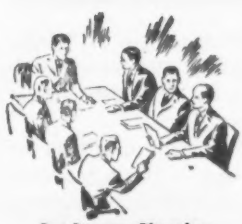


For Manufacturing Control Laboratories

For Research Laboratories



For Production Requiring Quality Chemicals



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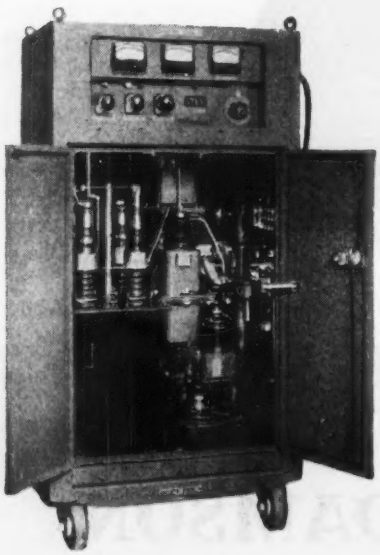
NEW EQUIPMENT

High-Voltage D-C Supply QC501

A new line of metal-enclosed, high-voltage d-c power supply units, available in ratings up to 50,000 volts d-c, has recently been announced by the General Electric Company. These units provide a convenient and reliable source of d-c power for applications such as testing of electric equipment; precipitation; induction heating; radio; and miscellaneous industrial and electronic applications requiring a high-voltage d-c supply.



Each unit consists of a full-wave kenotron rectifier, a filter to limit voltage ripple to one per cent or less, and complete control equipment—all compactly mounted in an attractively styled steel cabinet. The four kenotron tubes are mounted in sockets integral with the double-conductor, high-voltage terminals on the cover of the single oil-filled tank which contains the combined main and filament transformers. The d-c output voltage can be controlled, from zero to maximum, by means of a motor-operated, dry-type, variable autotransformer. All of the meters, indicating lights, and manual controls for the entire equipment are located on a recessed panel in the upper section of the cabinet.

The crackle-black enameled steel cabinet is provided with dust filters to prevent the accumulation of dust and dirt, and the interior is ventilated by an air-circulating fan. If a portable unit is desired, the cabinet can be furnished on a four-wheel dolly truck, or it may be ordered without the truck.

Among the several safety features incorporated in the unit is an automatic solenoid-operated discharge switch. This switch is interlocked with the main supply in such a manner that it automatically short-circuits the rectifier and discharges the filter capacitor through a resistor when power is removed. Safety interlocks automatically de-energize the equipment when the cabinet doors are opened.

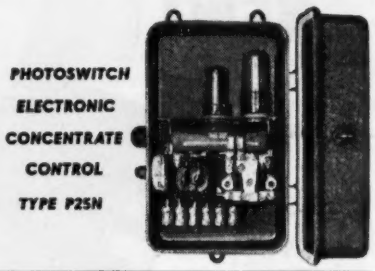
Concentrate Control QC502

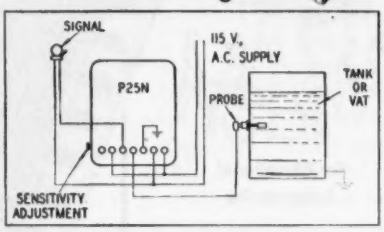
Photoswitch Incorporated announces an Electronic Concentrate Control for detecting and controlling, through operation of signals, valves or pumps, changes in liquid concentrations. This electronic method provides precise and accurate control for all applications in which changes in concentration are accompanied by a corresponding change in electrical conductivity.

Installation is made quickly and easily and requires only that a probe fitting be mounted on the tank, with probe extending into the liquid. This probe is wired to the electronic control which may be located wherever desired. An adjustment on the control housing is set so that the control relay will operate when liquid of a predetermined electrical resistance contacts the probe. While the probe is immersed in liquid of any other resistance, the control remains inoperative, but when a change in concentration alters the conductivity of the liquid to the necessary degree, the electronic control relay is energized to operate signals, valves or pumps.

An interesting application of this control is the detection of contamination in boiler condensate. A large smelting company, for example, uses condensate to heat coils containing an acid electrolyte. As a leak in the coils permits the acid to mix with the condensate and renders it unfit for return to the boilers, it is necessary to detect and control such leakage. This is accomplished through use of Type P25N. The addition of the acid to the water increases its conductivity and this change is detected by the electronic control. An alarm is sounded and a three-way motorized valve operates to remove the contaminated condensate. Type P25N is also used wherever it is necessary to maintain an interface between two liquids differing even slightly in electrical conductivity. Electronic operation thus permits single or two-level control of one liquid within a tank, even though another liquid may be above or below it.

Type P25N has a sensitivity range of 100 to 5,000 ohms and operates on a 5% change in probe-circuit resistance. The predetermined resistance value for which the control is set remains fixed regardless of variations in line voltage or tube characteristics. The voltage applied to the probe never exceeds 25 volts, thereby eliminating any possibility of electrical shock or explosive hazard. Type P25-N





incorporates a single-pole, double-throw relay, rated at 10 amperes A. C., 5 amperes D. C., for normally closed and normally open operation, and requires a supply of 115 volts A. C. 60 cycles.

Electric Heating Control QC503

A new type of Micromax Electric Control has just been announced by Leeds & Northrup Company for regulation of electric heating equipment.

Called "Micromax Electric Control, Duration-Adjusting Type," this system not only regulates electric input to hold temperature at a selected control point or to a program, but is said to hold there dependably.

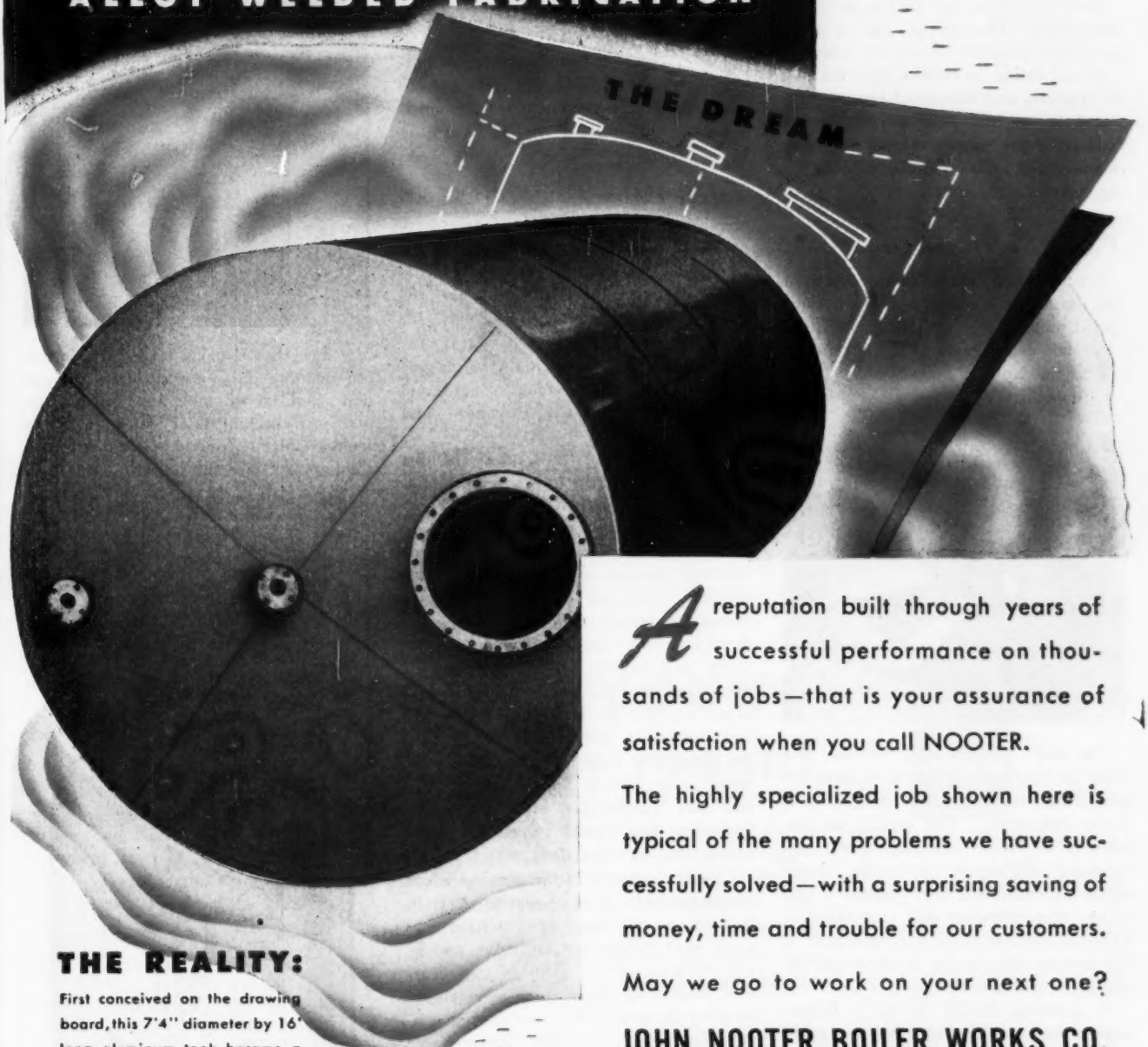
By means of an ON-OFF contacting system, it feeds to the heating unit the electric current needed to keep temperature to the required control point or program.

Input is either full-ON or full-OFF. Regulation is obtained by controlling automatically the time during which current is ON and OFF.

Employing the balance method both for measurement and control, this new system is a complete coordinated one, engineered to give its users the full benefits of correctly applied control. It provides full proportional *time* action, as compared with the more familiar full proportional *posi-*

A NAME TO BE TRUSTED

FOR STEEL, PURE METAL AND ALLOY WELDED FABRICATION



THE REALITY:

First conceived on the drawing board, this 7'4" diameter by 16' long aluminum tank became a reality in our shops. Acetylene, electric and atomic hydrogen welding, all contributed to its fabrication.

A reputation built through years of successful performance on thousands of jobs—that is your assurance of satisfaction when you call NOOTER.

The highly specialized job shown here is typical of the many problems we have successfully solved—with a surprising saving of money, time and trouble for our customers.

May we go to work on your next one?

JOHN NOOTER BOILER WORKS CO.

Alloy and Bi-Metal Fabricators

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ST. LOUIS

tioning action. It provides automatic droop-correction. It can be equipped with overshoot control, valuable when the furnace or other unit is coming up to temperature.

Pressure Gauges QC 504

The Brown Instrument Company, Philadelphia, has announced new spring and bellows actuated pressure gauges that measure ranges between zero and five inches, and zero and 50 inches of water.

Two new types of gauges are being introduced. One gauge has a single spring for pressure ranges, the other has a second spring, in tandem with the first, for vacuum and compound ranges. Applications of the new models include combustion pressures and steel, petroleum, chemical and aviation engine manufacturing, processing and testing.

X-Ray Spectrometer QC 505

A new Geiger-counter X-ray spectrometer has been announced by North American Philips Company, Inc. This unit (only one of its kind) is the latest addition to the Norelco line of industrial X-ray equipment.

The new Norelco Spectrometer provides an extremely accurate method for measuring distribution and intensities of X-ray reflections. For certain applications it has some advantage over conventional diffraction procedure which entails exposure and development of film besides measurements and computations. The spectrometer provides a rapid method for directly determining location and intensity of diffracted rays.

A scanning device, having a Geiger counter tube arranged to traverse a graduated quadrant, is used in combination with suitable scaling circuits. The intensity measurements are quantitatively accurate and can therefore be used to determine composition of crystalline mixtures. Quantitative analyses of mixtures can be obtained in a matter of minutes.

In actual operation, the specimen inserted in the specimen holder intercepts the X-ray beam and deflects portions of it at various fixed angles. When the Geiger counter tube is moved around its quadrant, it measures angular displacement and intensity of the deflected beams. A D-C microampere meter reads intensity—the quadrant, marked in degrees, shows diffraction angles. A stepping counter, employed in conjunction with a specially developed scaling circuit, provides a means for exacting quantitative determination of intensity.

X-ray diffraction analysis has almost unlimited fields of application in chemical and metallurgical industry. The Norelco Spectrometer is especially designed for accurate, rapid analyses. It is adaptable for use by unskilled operators in routine process control as well as in the research laboratory.

Power for the spectrometer unit is taken from any convenient 115 volt, 60 cycle A-C outlet. The overall dimensions are 30″ (width) by 44″ (length) by 44″ (height). Finish is crackle black.

Safety Valve QC 506

Farris Engineering Co., manufacturers of precision valve specialties, announces the development of a line of Venturi-Type safety valves with special provisions for constant accurate blow-off, exceptionally great capacity, complete tightness of re-seating, minimum escape of vapor into the surrounding space, and elimination of angular distortion and fouling.

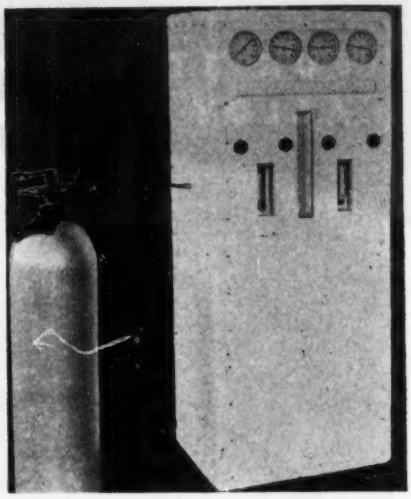
The inlet Venturi-tube nozzle of this design gives a clear unobstructed port and guided high velocity of the steam, which results in high lift and correspondingly great capacity. One of the many outstanding features of these valves is the patented "separator bell." This device causes the steam to make three changes in direction before passing into the atmosphere, and includes a drain for the condensed moisture into the body. Escape of vapor into the air is thereby minimized. The "separator bell" also helps to keep the spring cool by preventing steam from striking the spring, and improves freedom and maintenance of alignment by providing for higher support of the spring than in other designs.

Correct alignment of the stem, on which complete tightness of re-seating depends, is further maintained by precision machine work throughout the valve, and by top guidance of the stem in two bearings, instead of one or three as employed in other designs. This two-bearing construction, which has been demonstrated to be ideal for the purpose, eliminates angular distortion, minimizes fouling of guiding areas, and provides maximum ease of maintenance besides assuring greatest accuracy of re-seating.

ClO_2 Equipment QC 507

A new model of the generator which produces dry chlorine dioxide gas from chlorine and dry sodium chlorite has been developed by The Mathieson Alkali Works. The chlorite is now contained in a reaction tower within the control unit, in contrast with earlier models which required separate chlorite towers. Removable front and sides make all parts of the unit easily accessible for servicing. The new generator measures five feet in height, two feet in width, and eighteen inches in depth.

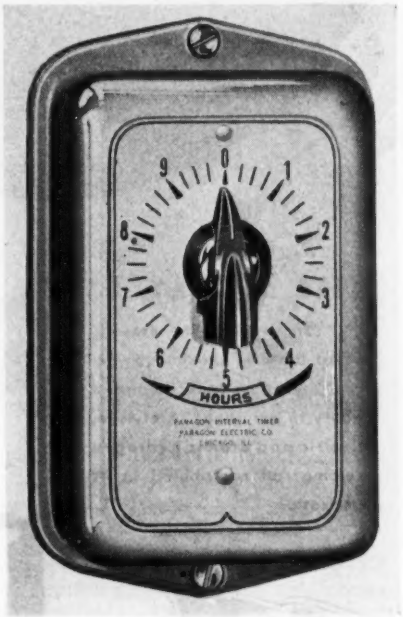
This equipment is used commercially to generate chlorine dioxide, a gas with



2½ times the oxidizing power of chlorine, for the dry bleaching of starch, wheat flour, high-fat soy flour and wool grease, and for checking blue mold in citrus fruits. Chlorine dioxide is also used in solution, in bleaching soap, paper and textiles, and in removing objectionable tastes and odors from public water supplies.

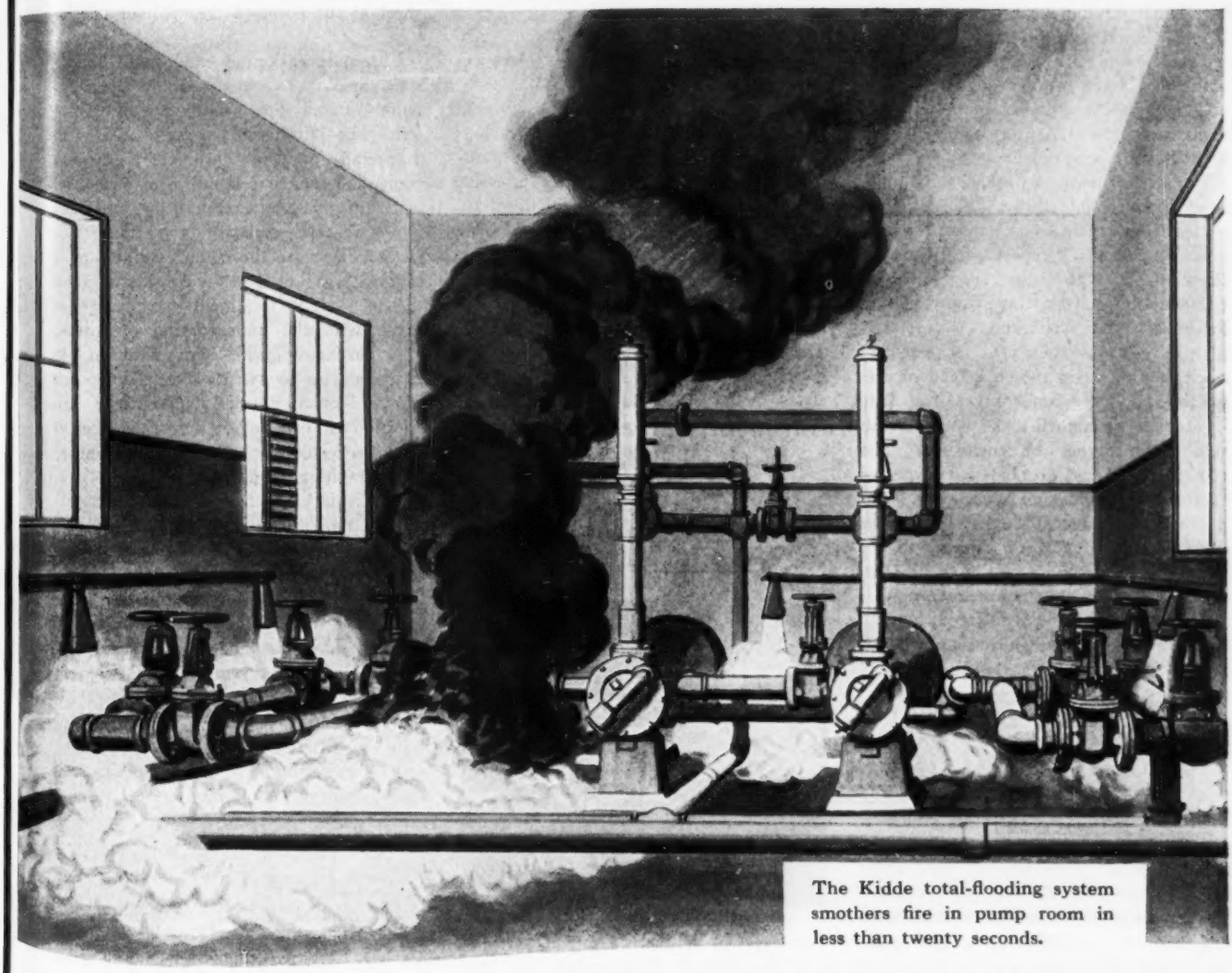
Interval Timer QC 508

A new manually preset interval timer has been announced by the Paragon Electric Company. The new model #2500 can be preset to allow a given operation



to continue for almost any pre-determined time limit; and to close or open a circuit at the end of the preset time.

This unit is particularly well adapted



The Kidde total-flooding system smothers fire in pump room in less than twenty seconds.

KIDDE GETS 'EM YOUNG . . . and treats 'em rough!

Big blazes begin life as little ones. But they grow fast and get *tough* when they feed upon chemicals and flammable liquids.

That's the method used in Kidde built-in systems to choke off tough fires as soon as they start . . . *in less than twenty seconds* . . . directing the carbon dioxide to the flames from specially designed nozzles. When *automatic* systems are used, fires are frequently killed before nearby workers realize a fire has started.

Moreover, Kidde systems leave no after-fire mess to be cleaned up; do not contaminate mixes; nor can they harm materials. For the carbon dioxide gas employed is dry, inert, odorless and non-toxic. Consequently, the Kidde technique is recognized as one of the fastest, cleanest and surest methods of fire-extinguishing in use today.

For safety's sake, check the accompanying list of typical chemical-industry fire hazards. If you have one of the tough-fire hazard areas in your plant, call in a Kidde representative. You'll find him wise in the ways of fire prevention. Drop us a line.

KIDDE KILLS TOUGH FIRES

- Process Rooms
- Mixing Tanks
- Agitators
- Pump Rooms
- Storage Areas
- Drum-filling Rooms
- Motors
- Transformers
- Electrical Control Panels

★

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for use in plastic molding, rubber curving, batch mixing, heat treating, enamel baking, liquid agitation, light exposure, blower, pump, and conveyor operations, watchman signals, food cooking, power and light machinery operation, control of ventilating fans on a preset schedule, and night heating shut-down.

Engineered features are: (1) Switch—single pole, double throw 1,000 watt capacity, fully enclosed, Underwriters approved; (2) only 2 exposed gears—motor pinion and wheel, precision hobbed; (3) motor—self-starting, slow speed, industrial type synchronous, completely sealed; (4) no energy is required of clock motor to trip switch at end of preset time; (5) ten time ranges from 0 to 15 seconds through 0 to 20 hours, available in all types of enclosures; and (6) all parts rust proofed and protected against corrosion.

The 2500 series can be mounted to the surface of any panel or directly to the surface of the equipment the timer is to control. Available for flush mounting or wall mounting with conduit connector.

Overall dimensions of the 2500 series are 4⅞" high x 3 1/16" wide x 2" deep.

Shaft Bearing QC 509

The Dodge Manufacturing Corporation announces a new Dodge-Timken Bearing known as Type "E" which is now available in both pillow blocks and flanged units. This bearing was engineered to provide all features necessary for satisfactory performance under normal service conditions at a low price which has been made possible by use of modern machinery and tooling.

It is designed to give 30,000 hours or more of service under conditions for which it is adapted as determined by use of standard selection tables applying to the complete Dodge-Timken line.

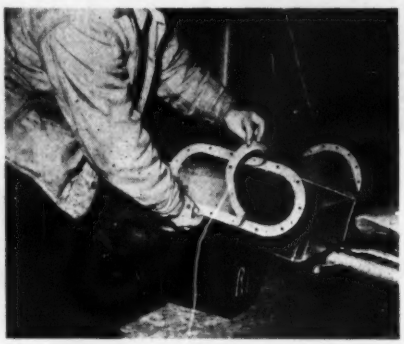
The method of fastening to shaft is simple and effective. On each end of the extended inner race is a steel collar having two headless set screws spaced 120° apart and extending through clearance holes in the inner race to the shaft. These four set screws provide a positive lock to prevent rotation of the inner race on the shaft.

Housings are compact and rugged and are precision machined to close tolerances on automatic machines.

Simple, effective labyrinth seals prevent loss of lubricant and protect bearings against damage from dust, dirt or moisture. These seals are equally effective whether the bearing is on or off the shaft. The bearings are completely assembled, lubricated and adjusted at the factory. While not fully self-aligning these bearings have enough self-alignment inherent in the design and arrangement of the Timken rollers to compensate for any normal misalignment.

Chromate Gaskets QC 510

A new type gasket, consisting of a felt base, impregnated with a chromate pigmented compound which renders the material flame and fire-resistant as well as corrosion resistant is announced by



The Sherwin-Williams Company. Originally intended as a substitute for low-pressure rubber gaskets required in marine ventilating systems, chromate gasketing has since demonstrated its usefulness in many other applications, including joint seals in water, fuel oil and diesel oil systems as wll as gasketing for air lock and refrigerator doors.

Chromate gasketing is flame and fire resistant to a high degree, thereby rendering it valuable where inflammable materials must be avoided. It can withstand relatively prolonged exposure to salt water without decomposition. It may be had either factory pre-cut or cut from sheet at the point of use without special tools.

Chromate gasketing employs as a base sheet material, a good grade of thoroughly felted, low shoddy content wool felt. The felt base is impregnated with a specially prepared chromate pigmented compound which is non-drying, tack and water insoluble and renders the felt flexible, pressure resistant and flame resistant. Because the compressibility of a chromate gasket depends considerably on the method of treatment, great care is taken with the impregnating operation.

A chromate gasket will maintain air pressures up to twenty-five pounds per square inch at normal temperatures. In addition to fire and flame resistance, it is not affected by fuels and has definite rust inhibiting properties. Chromate gasketing is dark green in color and is available in two thicknesses—⅛ inch and 1/16 inch. In addition to its original application for sealing joints in air ventilator lines, forced draft blowers and similar equipment, chromate gasketing may be used in flange-to-flange joints in drainage, fire main, fresh water, flushing, sprinkling, plumbing, fuel oil and Diesel oil systems. It may be employed for watertight or oiltight connections to structures and as gasketing for air lock doors, air lock relief valves, jointer doors, refrigerator doors and flame resistant closures.

Crane Truck QC 511

The new model L-11C combination crane truck announced by The Elwell Parker Electric Company has improved operating characteristics due to the addition of a separate motor for raising and lowering the boom. In previous models a single motor served to raise and lower both boom and hook, by means of a ratchet boom adjustment which was actuated when the lift hook was pulled up against the boom. By providing a separate motor for each function the operator is given a greater freedom of choice in manipulating the load.

The combination crane truck is a 4-way truck, serving as a lift-truck, a load carrier, crane and tractor. It loads itself either by picking up skid loads with the lift platform, or by lifting heavy parts and placing them on the platform for transport. As a tractor it pulls trailer cars, which may be loaded by means of the crane. The crane may be made available for heavy lifting at points where there are no overhead cranes. This model has a capacity of 6,000 pounds on the platform, 2,000 pounds on the hook at 42-inch radius and 1,000 pounds on the hook at 84-inch radius. It will travel at 6 miles per hour with no load and 5 miles per hour with full load under normal conditions. The platform is deeply flanged to insure rigidity and has three point positive support that assures load stability at all times.

CHEMICAL INDUSTRIES TECHNICAL DATA SERVICE

CHEMICAL INDUSTRIES, 522 Fifth Ave., New York 18, N. Y. (1-5)

Please send me more detailed information on the following new equipment.

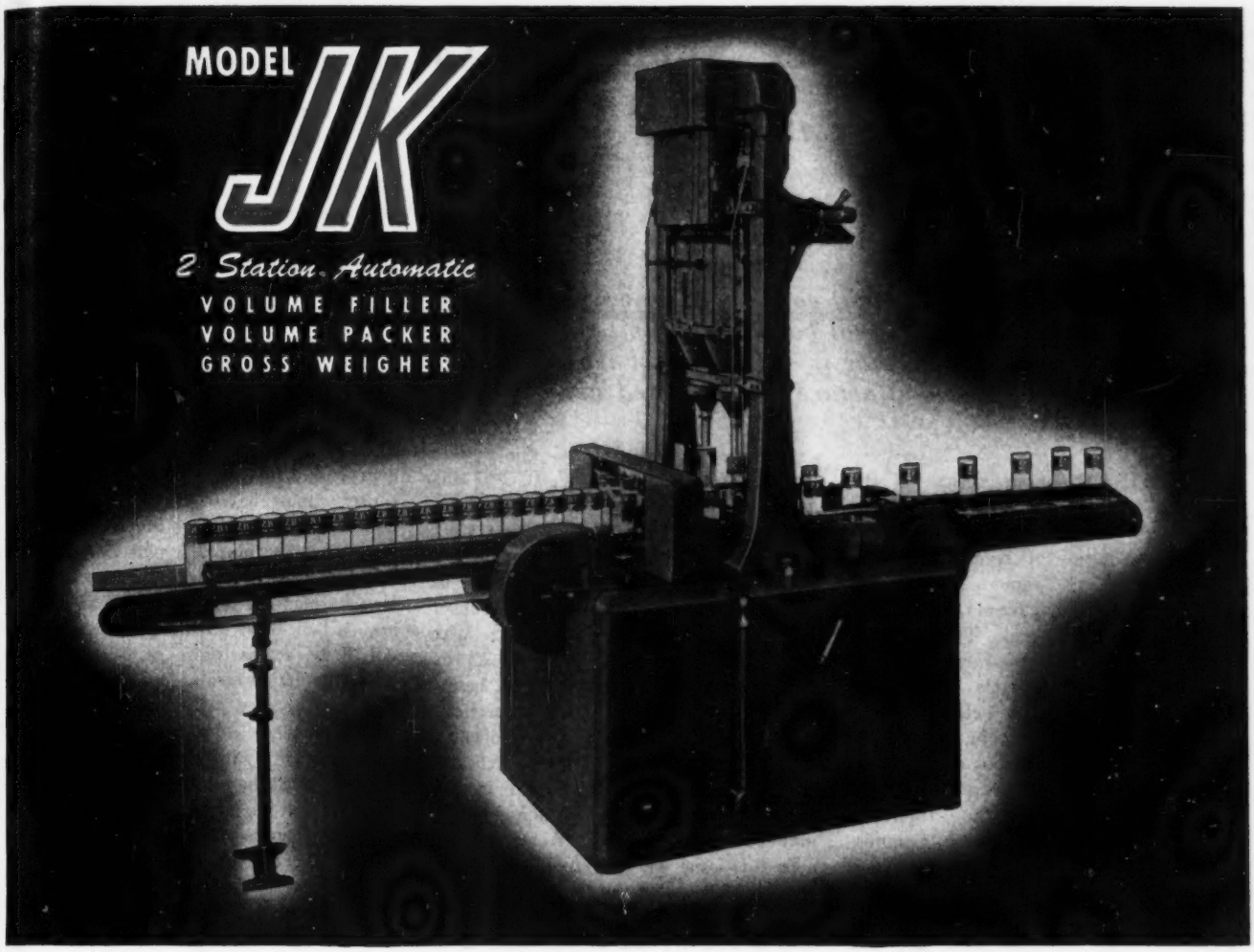
QC 501	QC 504	QC 507	QC 510
QC 502	QC 505	QC 508	QC 511
QC 503	QC 506	QC 509	

Name ..... (Position) .....

Company .....

Street .....

City & State .....



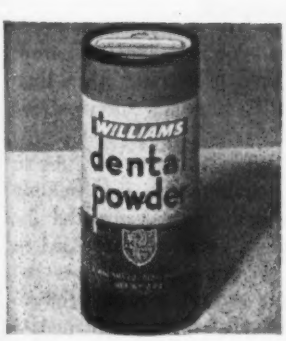
. . . for all types of powdered, granular and paste materials

The Model JK is an Automatic Packer that will also operate as a Volume Filler or Gross Weigher. This machine fulfills every requirement for advanced means of automatically handling powdered, granular and paste materials of almost all descriptions.

The Model JK has two filling stations. When the machine is used as an Automatic Volume Packer the empty containers are elevated, causing the actual filling to take place under the amount of controlled pressure suitable for the type of material and the size of container into which it has to be packed. This same principle is used when the machine is equipped as a Packer-Weigher, except that the main portion of the contents is packed under pressure, the remainder finished by weighing for accuracy. When the machine is used as a Volume Filler or Gross Weigher, provision can be made to incorporate a vibrating type of settling device to settle the material after filling.

The machine can be equipped for intermittent conveyor motion to facilitate handling of oval or irregularly shaped containers. With this intermittent motion, the conveyor moves just enough to deliver one container at the transfer station, thus preventing climbing and piling up of the containers.

The many new automatic features, plus the speed and accuracy of the JK, soon pay for the machine through savings on labor costs alone. It will pay to get full details and specifications — there are many features never available before — write today for bulletin which gives complete data on the Model JK!



Filled automatically on the JK at the rate of 60 per minute.

Send U.S. details on any of your packaging problems —we have the machines and the engineering background to help solve them.

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PACKAGING & SHIPPING

by T. PAT CALLAHAN

Metal Barrels and Drums

The sturdiest, safest, and most convenient shipping container for most materials is the metal barrel or drum, and for those reasons it is the most popular in the chemical industry. The specifications for its manufacture are discussed here.

CONTINUING our series on the ICC Specification packages, we shall in this issue discuss the most generally used series of specification containers used in the chemical business. This specification refers to metal barrels and drums and before entering into our discussion of various specifications which are prescribed by the Interstate Commerce Commission for this form of package, we believe it advisable to state that there are five series of metal drums, each of which will be discussed separately. These series are ICC 5, ICC 6, ICC 17, ICC 37 and ICC 42. This series of specifications covers drums constructed of sheet steel, stainless steel, nickel and aluminum and also covers containers which may be lead lined, aluminum lined or rubber lined. It also covers containers with openings which cannot be over 2.3 in. up to containers with full open heads. As we discuss each individual specification, we shall indicate the type of opening allowed, the material from which the drum may be constructed and in the cases of lined drums, the lining which may be applied.

T. Pat Callahan

In this issue we shall treat the ICC 5 series which constitutes the heavy returnable type of drum and shall discuss the ICC 6, ICC 17, ICC 37 and ICC 42 in subsequent issues.

Specification ICC 5A is commonly referred to in the chemical industry as the corrosive liquid or heavy acid drum and is the commonly used steel container which may be used for the shipment of corrosive liquids such as sulfuric acid, mixed nitrating acid, oleum, etc. However there are exceptions to this for sulfuric acid when under certain conditions of treatment with inhibitor or when the acid does not contain over a certain per cent of H_2SO_4, ICC 5H lead lined drums, ICC 5D rubber lined drums or ICC 17F steel drums may be used.

Some of the general details connected with ICC 5A drums are as follows: The capacity for straight sided drums is the rated capacity embossed on the head of the drum plus 2% and cannot be greater than the rated capacity plus 2% plus one quart; and for bilge-type containers the capacity must not be less than that embossed on the drum nor greater than the rated capacity plus 2% plus one gallon. The materials from which this container may be manufactured are steel sheets of low carbon, open hearth or electric steel. All body seams must be welded and head and chime seams must be welded or double-seamed. All flanges must be welded in place. Any container over 25 gallon capacity with flanged head secured to body must have chime reinforcement adequate for its protection. All straight sided containers over 10-gallons must have I-bar rolling hoops. Rolling hoops naturally are not a requirement for bilge-type containers. Any opening over 2.3 in. diameter is not permitted and the thread diameter and thread form of the flanges and plugs must conform to a specified drawing which is made a part of the specification. Removable head containers are not authorized.

The ICC 5A specification is the master specification for heavy duty or what is generally referred to as returnable drums, and the balance of the series of the ICC 5 specification follow this pattern. All ICC 5A drums, depending on their size and whether they are straight sided or bilge-type containers must be constructed from 12- to 16-gauge material. A drum with a capacity of 110 gallons must be constructed of 12-gauge material and a drum with a capacity up to 30 gallons must be constructed of 16-gauge material.

However, for less dangerous materials or for materials of a dangerous nature which must have protection other than steel, other ICC 5 series specifications are in force.

The ICC 5 differs from the ICC 5A in that certain requirements for welding both the head and chime seams and the flange are not a requirement. Also, a closure, if a threaded closure, does not have to comply with the rigid requirements of conformity of thread diameters and thread form. On straight sided drums, a U-type rolling hoop is allowed

Photo courtesy Sherwin-Williams Company

Rusty and dented steel drums are being stacked to await reconditioning. The war has made their proper care more important than ever.

BUSY EXECUTIVES

read

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Always at their finger tips, CHEMICAL INDUSTRIES is a dependable source of information. New Chemicals, new uses, chemical reports and trends are but a few of the topics authoritatively discussed.

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2. WHEN YOU WERE A DOUGHBOY in 1918, food in Continental cans helped you fight, just as it's helping millions of GI's everywhere today. Then, as now, Continental research developed new ideas and skills to give you new and better things in cans.

5. YOU WORKED HARD when this war began, often lunching at your desk. The liquid-tight paper containers and cups your coffee and ice cream came in are now made by Continental. So are fiber drums in which so many dry products are safely shipped.

6. WHEN THE ARMY CALLED you for procurement duty you realized the great job containers are doing in war. We're making metal and paper containers for virtually every branch of the armed forces and Lend Lease, plus hundreds of special war products.

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CONTINENTAL PRODUCTS: Metal Containers · Fiber Drums · Paper Containers · Paper Cups · Plastic Products · Crown Caps and Cork Products · Machinery and Equipment · **OPERATING DIVISIONS:** The Container Company, Van Wert, Ohio · Keystone Drum Company, Pittsburgh, Pa. · Boothby Fibre Can Division, Roxbury, Mass. Mono Containers, Newark, N. J. · Plastics Division, Cambridge, Ohio · Bond Crown & Cork Company, Wilmington, Del. · Cameron Can Machinery Company, Chicago, Ill. · **FOREIGN SUBSIDIARIES:** Continental Can Company of Canada, Ltd., Montreal · Sociedad Industrial de Cuba, S. A., Havana.

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the Continental Family

AND PAPER CONTAINERS AND PLASTICS

3. BY THE TIME YOU were 33, thousands of products besides food, from tooth powder to paint, were coming to you in sturdy, protecting cans. You bought motor oil for the first time in refinery-sealed cans, an advance pioneered by Continental.

4. REMEMBER THAT FISHING TRIP in '38? You took your favorite beer in Continental Cap-Sealed Cans because they were so convenient and easy to open. That year we started making crown caps. Since then we've made billions of them for cans and bottles.

7. WHEN YOU GET BACK on the job, you'll find a lot of things of colorful, durable plastics in your office and home—many of them fabricated by our Plastics Division. Today we're making plastic products, from bomber enclosures to battery cases.

8. LIFE BEGINS AT 40 for Continental Can Company! On our 40th anniversary, we suggest that you keep your eye on Continental for packaging and plastic products. And keep your eye on the Continental trade-mark, too! You'll be seeing the Triple-C more and more in industry and in your home.

CONTINENTAL CAN COMPANY

Keep your eye on Continental **C** *for Packaging and Plastic Products*

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ON BOTH YOUR FINE WORK AND FORESIGHT ON THE PAYROLL SAVINGS PLAN!

IN your wholehearted support of the Payroll Savings Plan, you are doing far more than backing the most valid system of war financing—and building a powerful dam against the onrush of dangerous inflationary dollars.

By encouraging the all-out participation of your employees in this greatest of all savings plans, you are helping to create a sound economy for post war days.

With this same plan, you are assisting working America to build a mainstay against the inroads of unemployment and want—to save for homes, educational advantages and old age comforts!

You and your employees, through *mutual* cooperation in this forward-looking plan, are gaining a new and closer understanding—the cornerstone of a firmer, *mutually* profitable relationship!

National benefits, too, follow the "All Out" effort you are making! The prosperity of our United States rests on the economic stability of both management and labor. Your Payroll Savings Plan is working constructively toward the assurance of both!

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That is why Cole Laboratories, Inc., Long Island City, N. Y., package their Foam Liquid and Speed Foam Drench in Crown cans. Completely protected by Crown cans, Cole products are kept laboratory-fresh . . . always ready for life—and property-saving service.

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CROWN CAN

for certain construction as well as the I-bar, and no rolling hoop is required on a bilge-type drum. Removable head containers which will pass the required tests are authorized under ICC 5 specification. These ICC 5 drums are generally used for the various forms of poisonous and inflammable materials and are also authorized for alkaline corrosive liquids.

The advantage in the use of these drums is that they are sturdy and safe containers for movement of these materials and do not have to be constructed of as heavy material as the ICC 5A drum. Consequently, there is a saving in freight.

ICC 5B drums are a slight modification of the ICC 5 in that neither I-bar or U-type of rolling hoops are required and are generally constructed with rolled or swedged-in hoops. There is a slight saving in the cost of ICC 5B drums over ICC 5 and this type of drum is generally used when a better drum than a single trip drum is required and a drum of the ICC 5 construction is not necessary. In fact, it is in between a single-tripper and the ICC 5 drum.

ICC 5C drum is a special drum manufactured from stainless steel and is permissible for the movement of certain dangerous liquids which may attack carbon steel or may be necessary to protect the product. Removable head containers are not authorized. These must be constructed of 14-gauge material for the 110-gallon size down to 20-gauge for any size up to 15 gallons.

ICC 5D are rubber lined drums. The rubber lining must be applied so as to adhere securely to the metal throughout, and the lining must be tough and pliable. Hard rubber is authorized to line closing devices. Except for the requirement that head and chime seams must be welded or double-seamed and the flanges must be welded in place and special thread diameters and thread form is not required, the specification for the construction of the ICC 5D drum must comply in general with the specification of the ICC 5A drum. This drum is generally used for the shipment of corrosive liquids which are better protected in rubber than in metal.

ICC 5F is a special container which cannot be made to hold over 11 gallons and is not used generally in the chemical industry, although it is in the regulations and is permissible. The construction must comply generally with ICC 5A and one of the important tests requires that the hydrostatic pressure be 125 lbs. per square inch sustained for 5 minutes as compared to the hydrostatic pressure of 80 lbs. per square inch sustained for 5 minutes which is a requirement for the ICC 5A drum.

ICC Specification 5G must be constructed of steel, except for rolling hoops and chime reinforcement, of an austenitic 18 and 8 chrome nickel alloy with carbon content not over 0.08%. While this container in general follows the pattern of the ICC 5C drum, it may be constructed of lighter material for similar capacity and is used for materials which may not be as hazardous as those required to be shipped in the ICC 5C container.

The ICC 5H is practically the same as ICC 5D, only lead lining which must be 3/32 in. thick completely bonded to the steel is used. Openings over 2.3 in. diameter are not permitted and threads for plug or cap must not be less than 8 per inch when the opening is over 3/4 in. standard pipe size. This ICC 5H container may be used for liquids which may attack steel and which are impervious to lead, for instance, phosphorus trichloride or phosphorus oxychloride.

ICC 5K drums must in general comply with Specification ICC 5A except that the material used must be, except for rolling hoops and chime reinforcement, nickel at least 99.0% pure. This drum is also used for certain liquids which are impervious to nickel.

ICC 5L is a special steel container which must be rectangular in shape and the capacity cannot be over 5 gallons. This container has a flange spout for filling and emptying which must be welded in place or attached in a manner approved by the Bureau of Explosives. This container was designed and then approved by the Interstate Commerce Commission particularly for the Armed Forces and is used almost entirely by them.

ICC 5X is an aluminum lined drum which must comply in practically all respects to Specification ICC 5A, and in addition the lining must be constructed of 99.0% pure aluminum, thickness 0.12 in.; all seams welded. It should be welded so that and be arranged so that extensive movement within shall be prevented. This drum is authorized for nitric acid over 1.46 specific gravity (45.75° baume). The acid should not contain more than 0.1% of hydrochloric acid, or more than 1% of sulfuric acid, or more than a trace of any of the lower oxides of nitrogen.

Safe Handling and Stowage of Chemicals In Transportation

For years the Bureau of Explosives and the Association of American Railroads have devoted a great amount of time in instructing shippers on the safe loading, bracing and stowage of containers containing all forms of commodities and have laid particular stress upon this factor so far as it concerns the shipment of chemicals and materials of hazardous nature. In addition to this, various companies have engineered methods of strapping and bracing which have been of major help in properly shipping commodities. Educational programs on the proper methods of loading barrels, boxes, drums, carboys, cylinders and bags have been inaugurated by these agencies in an effort to cut down losses in transportation and deliver the products safely.

In bracing of rigid containers the use of metal bands has been developed by several large companies and this has had a marked effect upon safe handling of shipments. Manufacturers of multiwall paper bags in conjunction with the Association of American Railroads have developed proper ways of loading bags so that hazards formerly occasioned by tearing and breaking at the doors are eliminated and other methods of locking bags in place have definitely helped in the safe shipping of this form of package. The Bureau of Explosives has issued diagrams from time to time showing correct methods of bracing and were it not for this very worthwhile information, the loss occasioned by breakage would be far greater than it is.

It has been pointed out that a car moving at a speed of five miles per hour will subject the packages inside to a pressure as high as five times the total weight of package involved when the car strikes a solid train of loaded cars.

If a shipper of any hazardous commodity has any doubts as to the sufficiency of the bracing used, it is far better to have the car over-braced than under-braced and particular attention should be given to this. It is to the shipper's, the carrier's and the consignee's advantage that materials placed in transportation arrive in a safe condition, and to this end, too much emphasis cannot be placed on the fact that the loading, stowing and bracing of cars containing chemicals is a serious proposition and cannot be treated too lightly.

Restrictions Relaxed On Metal Containers

The restrictions on the use of metal for cans and closures for glass containers have been modified to permit use of steel instead of substitute materials, many of which are now more critical than steel, according to the War Production Board.

The metal can order, M-81, has been changed to permit packers the use of untinned steel without quota restrictions, since sheet steel supplies are now more adequate than those of paper or several other packaging materials. Most of the previous restrictions on the use of tin for packaging purposes are retained.

The new order is expected to save manpower, WPB said, for in many instances less labor is required to make and fill metal containers than is required for comparable substitute packages.

At present, the labor situation is such that metal containers to replace substitute packages may not be available for some time, and the materials picture changes so rapidly that continued supplies of steel for these purposes cannot be guaranteed.

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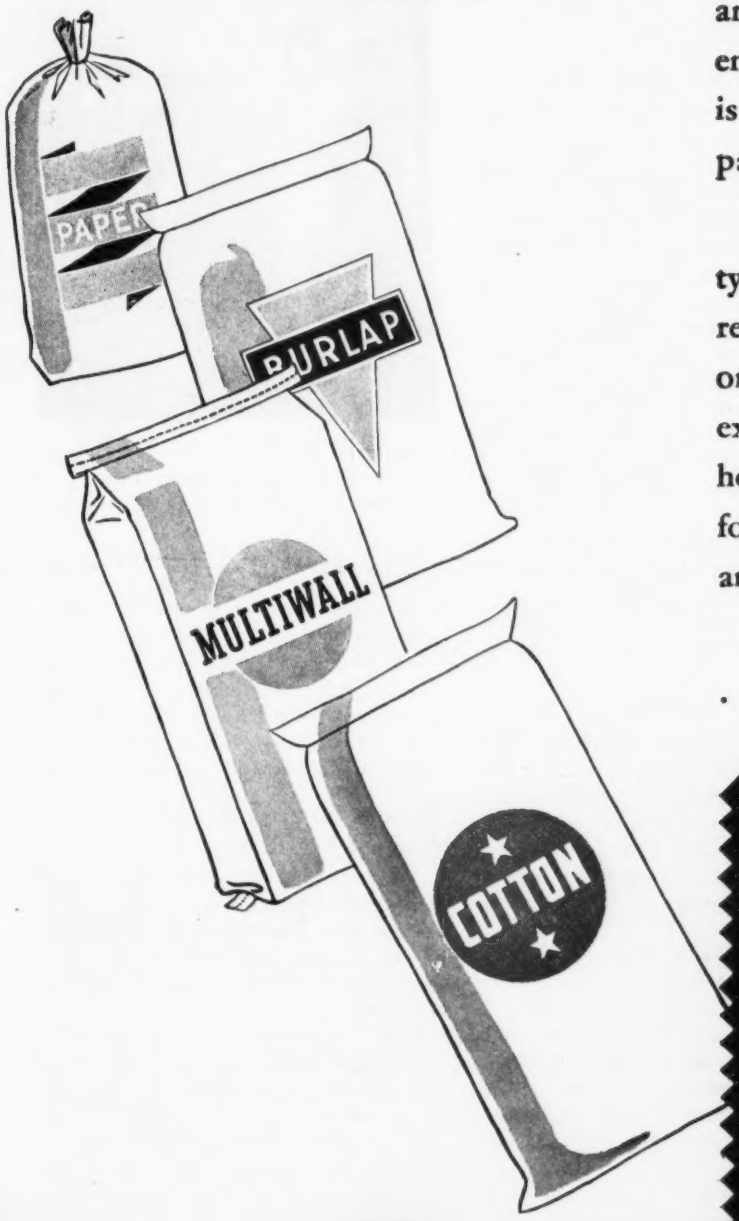

WHEN you buy your bags from Bemis, among the important advantages you enjoy is this: You can buy whatever type is best for your particular use—cotton, paper, multiwall, burlap or waterproof.

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BETTER BAGS SINCE 1858

PLANT OPERATIONS NOTEBOOK

Silver-Brazing of Tanks

In fabricating a tank or container, whether of copper, brass, steel, or other metal, in which the head is silver-brazed on, the joint should be designed as shown in Fig. 1, that is, with the head lapped over on the outside of the shell. This will make fabrication much easier. If the head flange is inserted inside the shell, the outside diameter of the free end of the shell will expand during heating more than the outside diameter of the head, and trouble will be encountered from cracking during cooling. The heavier the material, the worse this condition becomes.

In silver-brazing operations, just as in welding, it is advisable whenever possible to avoid joining two pieces of unequal thickness, as shown in Fig. 2, for example. This can often be avoided by redesigning the joint, as shown in Fig. 3, so that the mass of the adjoining parts are equal. Obviously, less heat will be required to make the joint. The difference in expansion on heating and contraction on cooling depends on the mean diameters of the adjoining parts. The difference in mean diameters in Fig. 2 is much greater than in Fig. 3. Therefore, the expansion on heating will be greater and may cause the silver alloy to crack when cooling takes place.

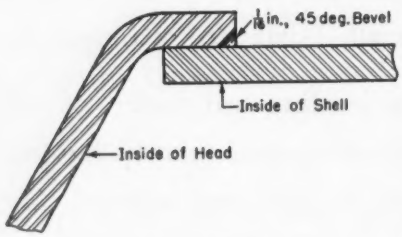


Fig. 1—Tanks with silver-brazed heads should be so designed that the head laps over the outside instead of being inserted inside the shell.

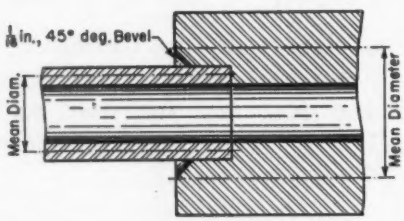


Fig. 2—If the metal on one side of the joint is thicker than on the other, uneven contraction may give rise to difficulty.

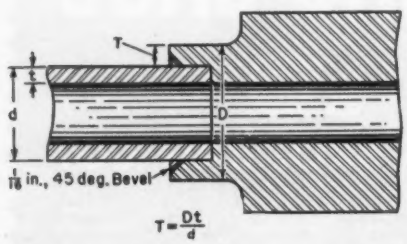


Fig. 3—Whenever possible, redesign a joint like that shown in Fig. 2 so that the mass on each side will be about equal.

Self-Bonding Floor Material

Every plant owner knows that installing a new floor over old cement involves lengthy preparation of the subfloor, application of adhesives, and other time- and money-consuming operations. Now a flooring material is available that is self-bonding. It can be laid over old concrete, cement, wood, or composition without adhesives or separate bonding agents.

This material, known as Stonoleum, feels like rubber and wears like stone. A unique colloidal composition gives it greater resistance, not only to direct impact and load, but also to continuous vibration, abrasion, and other effects of traffic.

Another interesting characteristic is the "self healing" feature of Stonoleum. Small holes in a Stonoleum floor, such as those left when machines or fixtures are removed, disappear under traffic.

Steam Pipe Fitting

Here is a method for dimensioning lengths of steam pipes in such a way that they can be removed easily in case of repairs. The method was brought to the writer's attention by a designing engineer who holds a responsible position with a large eastern utility company of national repute.

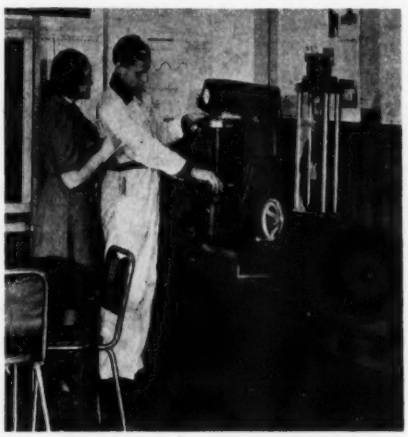
As every reader doubtless knows, it is common practice, where a straight steam pipe is installed in an average plant, to make little if any allowance for pipe expansion when under steam. The expansion is permitted to "take care of itself," which often creates dangerous stresses in the pipes and auxiliary connections.

To take care of these elongations in places where bends are impractical or are to be avoided if possible, this designer made the pipe initially too short—a small fractional part of an inch for every ten feet of pipe length. The longitudinal stresses in the pipe, when cold, are therefore tensional stresses. Hence, should it be desired to take out a length of the pipe, a bolted flange-pipe may be dropped out with the utmost ease.

Calculations are such that when the pipe is under steam pressure the shortage is taken up by expansion. Then there are no longitudinal stresses in the pipe whatever. So, in addition to making for convenience, this method possesses safety advantages.

Welding Service

The Eutectic Welding Alloys Company maintains a model welding shop and test-laboratory at its home office, 40 Worth Street in New York City. The welding shop has all the necessary equipment for electric arc, carbon arc, oxy-acetylene welding, gas flames and furnaces. The



shop, under the supervision of Mr. H. V. Kough, a welding specialist, is used to test random samplings of its welding rods and fluxes.

The centrally located laboratory and the welding shop are very much at the service of the firm's customers. The laboratory, besides containing the usual chemical reagents for the testing and etching of welds, has facilities to determine the tensile strength of welded joints, the transverse tensile strength of all-weld metal as well as the hardness of welds and parent metals.

Non-Sparking Scoop For Explosives

A nonsparking scoop for use in transferring nitrocellulose from barrels to mixers and other vessels is being made available by Hercules Powder Company's Cellulose Products Department to Hercules customers.

Made from hard fiber, the scoop is the latest of a series of tools supplied by Hercules, the use of which will minimize the possibility of sparks igniting nitrocellulose during unloading operations.

The scoop is eleven inches in length and seven inches in diameter at the base. Other safety tools supplied by the company include nonsparking speed wrenches and nonsparking forks.

volumetric flask. A 100 ml. aliquot is

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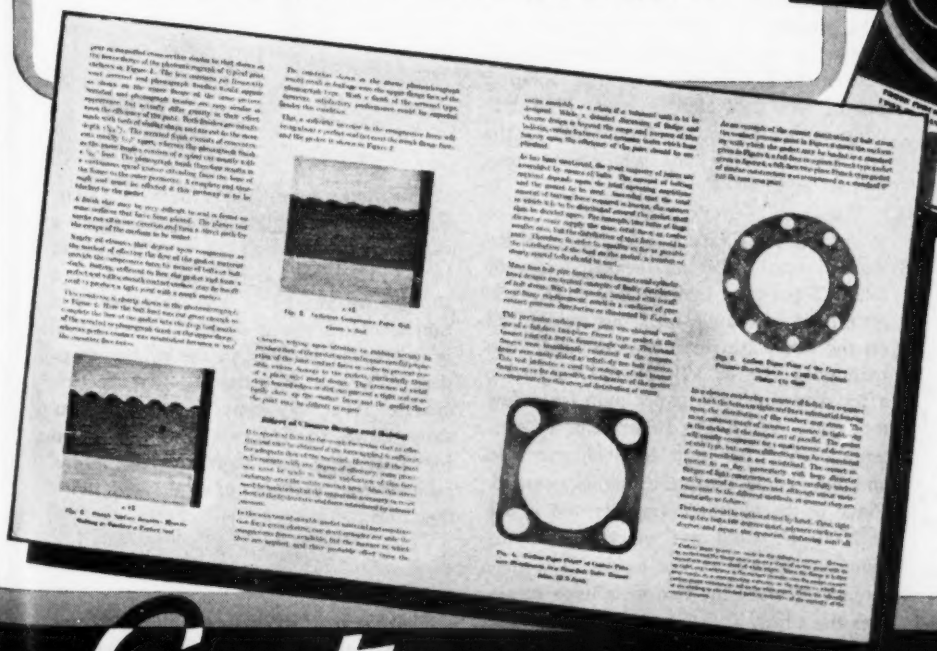

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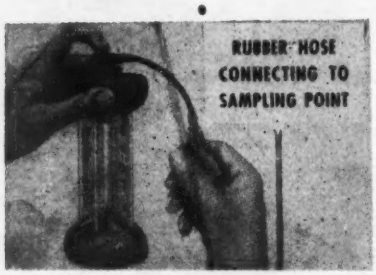
LABORATORY NOTEBOOK

Oxygen Indicator

A portable gas analyzer, the Fyrite Oxygen Indicator, that enables rapid determination of 0_2 with an accuracy of ½ of 1% 0_2 at any point of the scale has just been introduced. The instrument employs the fundamental Fyrite principle of chemical absorption. Its accuracy is not altered by vibrations or shock.



A sample of the gas or atmosphere to be tested is pumped into the Fyrite with the aspirator bulb, as illustrated. Release of the finger pressure on the connector at the end of the rubber tubing automatically locks the sample in the calibrated measuring chamber of the instrument. The apparatus is then turned bottom-side up, and back again, which causes the absorbing fluid to mix with the sample.

Absorption of the oxygen creates a suction which draws the absorbing fluid up into the graduated tube in an amount equal to the 0_2 absorbed. Thus, the level of the fluid column shows 0_2 percentage, which is read directly on the graduated scale. The standard range is 0 to 20%.

The entire Fyrite 0_2 test, including pumping of the sample, takes about 40 seconds. The process is entirely automatic, and does not require any previous instruction, skill, or training.

Bathing Lab Apparatus

It is difficult to keep laboratory apparatus clean, especially semi-micro apparatus such as small test tubes, funnels, crucibles, and glass tubing.

An answer to this problem is to place the pieces of apparatus in a refrigerator dish (9" long, 4" wide, 3" deep) with a tightly-fitting lid, partly filled with recovered alcohol or some other suitable organic solvent. (It is desirable to keep this near the sink where it can serve as a convenient depository for waste solvents.)

The apparatus is periodically removed from the solvent bath and placed in a solution of trisodium phosphate. It is kept there overnight or for a longer period, depending on the length of time required to clean it.

Determination of Columbium in Steel

John H. Vail of the Dow Chemical Company, presents the following rapid method for the determination of columbium in steel, using the same sample as the one used for chromium, nickel and silicon.

As a 0.5 g. sample is generally used to determine chromium and nickel in this material, it is speedy and convenient to analyze this same sample for silicon and columbium, although more accurate work would require a larger sample.

Accordingly, weigh out a 0.5 g. sample into a 250 ml. beaker. Add 25 ml. of hydrochloric acid (1:1) and heat till the initial reaction is complete.

Add 10-15 ml. of 60 or 70 per cent perchloric acid and heat to strong fumes. Heat until all the chromium is in the form of chromic acid and the residue is a bright orange red. Remove from the hot plate, cool and dilute to about 200 ml. with water. Boil for several minutes to remove any chlorine. Again remove from the heat and filter through a No. 42 Whatman filter paper, reserving the filtrate in a 600 ml. beaker. Wash several times with hot water. Remove the beaker and reserve for the determination of chromium and nickel. Wash the precipitate and paper with hot 5 per cent hydrochloric acid and hot water till clean. This precipitate of columbium pentoxide and silica is placed in a tared platinum crucible and cautiously ignited at 1390° F. The crucible is cooled and weighed. The residue is moistened with a few drops of concentrated sulfuric acid and about 5 ml. of 48% hydrofluoric acid. The crucible is heated on the hot plate to the absence of fumes and again cautiously ignited at 1390° F.

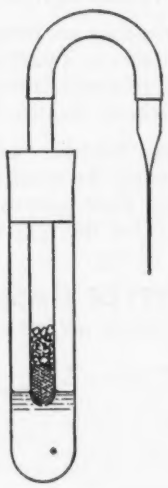
The crucible and its contents are cooled to room temperature and the residue washed into a 250 ml. beaker with 100 ml. of 5 per cent hydrochloric acid. Add 30 ml. of saturated sulfurous acid. Boil on the hot plate for 5 minutes and filter through a No. 42 Whatman filter paper, after digesting with paper pulp for a few moments. Wash the paper and its contents with 5 per cent hydrochloric acid and hot water until thoroughly washed. Place in the platinum crucible and ignite at 1600° F. Cool and weigh the columbium precipitate as the oxide. The difference between the two weighings measures the silica.

The filtrate from the first filtration is used for the determination of chromium and nickel. It is diluted to 500 ml. in a volumetric flask. A 100 ml. aliquot is taken for the determination of chromium by titration with ferrous ammonium sulfate and potassium permanganate. A second 100 ml. aliquot is used for the precipitation of nickel by dimethylglyoxime.

Duplicate analyses of columbium bearing stainless steels give good agreement, when analyzed by the proposed and other similar methods.

H_2S Generator for Micro Work

Description of a micro H_2S generator by S. Gaddis has appeared in the Journal of Chemical Education. In micro work it is necessary that the gas be bubbled into solutions through jet tubes which have been drawn down to a fine point. Laboratory workers in micro qualitative analysis realize the difficulty in getting the gas from the usual Kipp arrangements or from the piped laboratory supply to develop enough pressure to overcome the surface tension of the water at the tip of the tube. The diagrammed generator has the advantage that the H_2S is delivered under sufficient pressure to form the "micro" bubbles.



The inner tube (made from a 25-cm. length of 8-mm. glass tubing heated to a capillary constriction at one end) has in it a 2-cm. pack of glass wool as a support for the FeS. The 6x¾-inch test tube contains the 6 *N* HCl. Generation is started by pushing in the rubber stopper. When it is removed, the reaction ceases. If at any time the flow of gas slows down, the stopper may be removed for a moment and then replaced. This renews the contact of the acid with the FeS.

The item, "Removing Nickel from Plant Solutions," page 780, vol. LV, no. 5, was contributed by Paul Von Stein of the American Smelting & Refining Co.

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INDUSTRY'S BOOKSHELF

Data for Mineralogists

DANA'S SYSTEM OF MINERALOGY, *7th* EDITION, VOL. I, ELEMENTS, SULFIDES, SULFOSALTS, OXIDES, *by C. Palache, H. Berman, and C. Frondel.* John Wiley & Sons, Inc., New York, 1944; 834 pp., $10.00. Reviewed by *Dr. Ludo K. Frevel,* The Dow Chemical Company.

TO MINERALOGISTS and crystal structure investigators the publication of the seventh edition of *Dana's System of Mineralogy* is a welcome event. This standard work has been entirely rewritten and the reason for the marked departure from the previous editions is best expressed in the authors' own words: "In 1892 Edward S. Dana published the sixth edition of his father's *System of Mineralogy,* dating from 1837. In the preface to the work, followed as it is by excerpts from the prefaces of the preceding editions, Dana gave in briefest outline the history of the successive changes that the development of the science had brought about. This book soon became and still is a recognized authority, used wherever mineralogy is studied. . . . During the half century which has elapsed since that edition appeared, vast changes have affected the science of mineralogy. In undertaking a new edition, the authors began with the definite intention of preserving the long-familiar form so far as should prove possible. But after a few years spent in the attempt to incorporate in the pages of the sixth edition the accumlated new data, this proved to be impossible and in its present form the book will be found to be essentially a new work." However, the seventh edition (Vol. 1) follows the pattern of its predecessors by devoting nearly nine tenths of its space to concentrated detail on the first eight classes of minerals: (1) native elements; (2) sulfides, including selenides, tellurides; (3) sulfosalts; (4) simple oxides; (5) oxides containing uranium, thorium, and zirconium; (6) hydroxides and oxides containing hydroxyl; (7) multiple oxides; and (8) multiple oxides containing columbium, tantalum, and titanium. The introduction of this commendable volume covers 84 pages of which 34 pages are devoted to morphological crystallography, 36 pages to an extensive bibliography, and the remaining pages largely to the changes found necessary in the seventh edition. Of these changes the more far-reaching are: (1) the introduction of data derived from x-ray crystallography, (2) a new mineral classification based on crystal chemistry, and (3) the presentation of crystallographic data based on position angles ascertained from two-circle goniometer measurements and on the gnomonic projection made from these angles. Admittedly the classification of minerals on the basis of atomic structure is a fundamentally sound approach; yet the realization of this goal remains incomplete because for many mineral types no rigorous structure determination has been carried out. For example, in the case of the sulfosalts (preferably designated as multiple sulfides), there are ten types enumerated of which only two have been studied in sufficient detail to warrant a classification from structural considerations. Nonetheless, the authors should be complimented in their audacious start; for if the publications in *The American Mineralogist* in recent years are an index to future trends, x-ray crystallography and structure analysis will be the lot of modern mineralogists.

Chemists interested in petrographic analysis or in the identification of solids by x-ray diffraction methods will find this authoritative reference book on mineralogy quite helpful in their work. It is hoped that the untimely death of Dr. Harry Berman will not delay too greatly the writing of the two succeeding volumes.

On Coating Compositions

VARNISH CONSTITUENTS, by *H. W. Chatfield.* Leonard Hill, Ltd., London, 1944; Photo-reprint, Interscience Publishers, Inc., N. Y., 1944; 474 pp., $7.00. Reviewed by *E. L. Kropa,* American Cyanamid Company.

WITH ALL THE EMPHASIS which has been placed on high molecular weight organic compounds and their uses in plastics, as fibers and as rubbers, one is apt to forget that these same polymeric compounds also find wide utility in coating compositions and it was in coating compositions where many of the synthetic and natural resins were first used extensively. It is the purpose of this book to describe the various raw materials which enter into varnish making and the developments which have taken place in this field. The approach to the subject is descriptive and theoretical aspects such as mechanisms of resin formation and drying hypotheses have been excluded. The text is well sprinkled with the author's own observations on many pertinent topics.

Oils, monoglycerides, natural and synthetic resins, solvents, plasticizers, driers, antioxidants, waxes and rubber are all adequately treated. The chapters on oils cover not only the common oils, but many of the rarer oils are touched on. The natural oil varnish resins, the natural spirit varnish and the modified natural varnish resins receive their fair share of attention. The discussion on phthalic resins leans very heavily on the patent literature and at times the patent lingo becomes so involved that one does not know whether one is reading a text or a patent specification. The chapters on solvents and plasticizers, although good, lack effectiveness because the book seeks to avoid mentioning cellulose derivatives. The author distinguishes between lacquers and varnishes in that the latter involve cooking the ingredients where as the former are mixed at ordinary temperatures. At the same time he devotes many pages to thermoplastic resins such as polystyrene, the polyacrylates, the polyvinyl compounds and chlorinated rubber which would logically fall into the lacquer category. Certainly the nitrocellulose-alkyd resin combinations deserve at least a passing attention. The chapters on driers, metallic soaps and antioxidants are particularly good.

Certain minor errors appear in the text: So many of the structural formulae of the esters in the table on "Constants of Solvents and Diluents" are incorrect that it appears the author was using some new convention; the suggestion of using polyglycerol acetate as a flame proofing agent on page 332 does not appear justified; the statement that bitumens are found in Connecticut is obviously a mistake; and it is poor judgment to classify polythylene is a synthetic rubber.

Aside from these minor criticisms, the book should find a place in any varnish chemist's library and the excellent tables on resins, oils, acids, monoglycerides organic liquids and driers make it an invaluable handbook in the laboratory.

Other Publications

A.S.T.M. STANDARDS ON PETROLEUM PRODUCTS AND LUBRICANTS. The latest compilation of all A.S.T.M. specifications, methods of tests, and definitions pertaining to petroleum products has been published including approximately 80 standards plus supplementary material.

In addition to the current report of the Society's Committee D-2 responsible for most of the standards, are certain proposed methods, for example, one on saponification number of petroleum by electrometric titration, and another on proposed conversion tables for petroleum oils of metric tons to long tons and short tons, as well as a discussion on oil measurement, proposed methods of analyzing petroleum sulfonates, and a test for potential gum in aviation gasoline.

The large number of test methods provide authoritative procedures for determining properties of a wide range of petroleum products, for example, acid heat of gasoline, aniline point, burning quality of various products, carbon residue, color, distillation, specific gravity, knock characteristics of fuels, melting point, etc.

This bulletin can be obtained from A.S.T.M. headquarters, 260 S. Broad St., Philadelphia 2, Pa., Price $2.75.

THE BLUE BOOK OF SOUTHERN PROGRESS contains reliable facts and statistics about every state in the South, their resources and progress, with a comparison of the South's growth to that of the country.

This annual gives data on commerce, industry, mining, banking, population, education, and the part they play in the economy of the Southern states.

Published by Manufacturers' Record, Baltimore 3, Maryland. Pre-publication price, $1.00.

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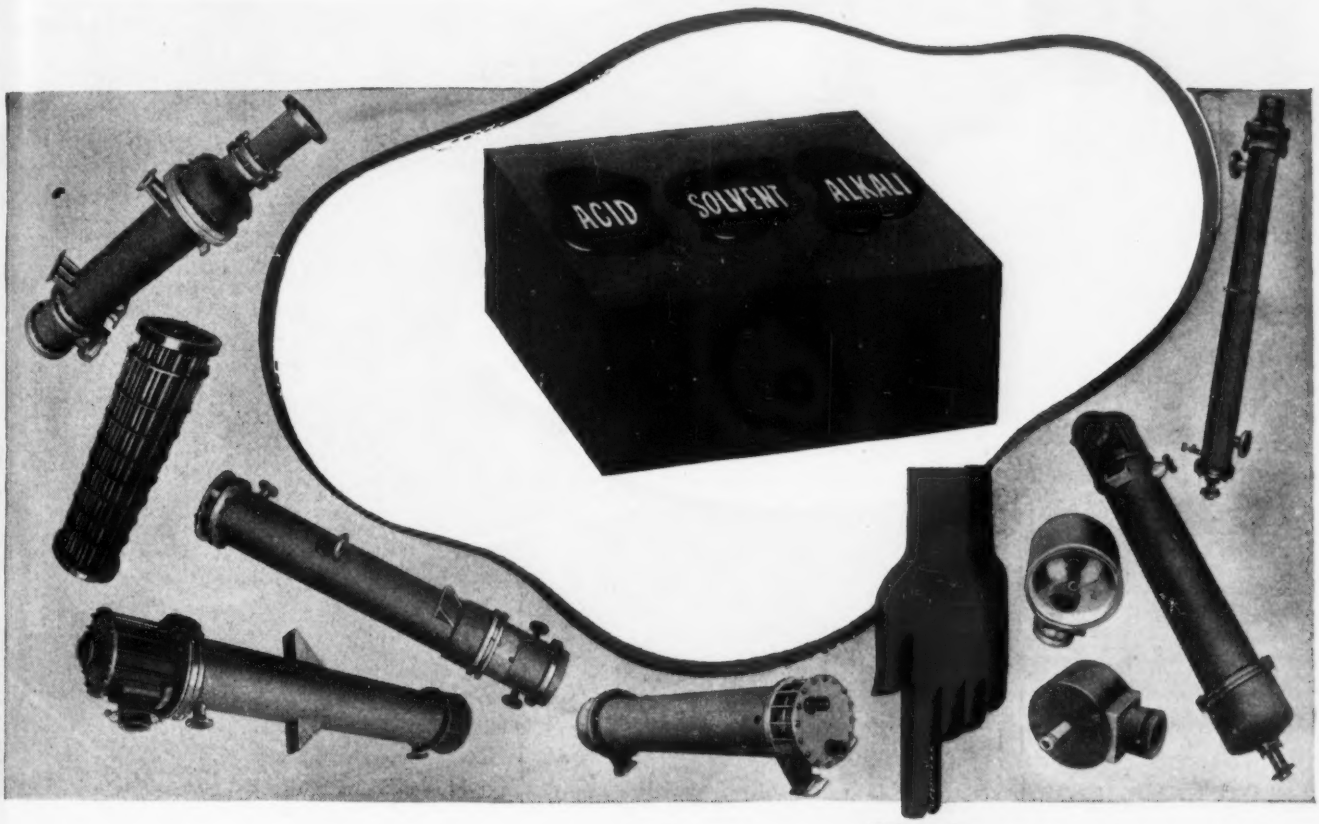

WHERE UTMOST RESISTANCE to the action of strong chemicals is required, "National" carbon and graphite and "Karbate" products excel. This means for heaters and heat exchangers. For pipe, tubes, fittings, pumps, valves. For tanks, tank linings and furnace linings. For flooring and porous products. For innumerable other applications.

In many of these, "Karbate" material is used. "Karbate" equipment, in addition to being impervious to seepage of fluids under pressure, has adjustable properties, according to whether carbon or graphite is the base. Specifically, the properties of carbon, graphite or "Karbate" products can be prescribed for your particular requirements.

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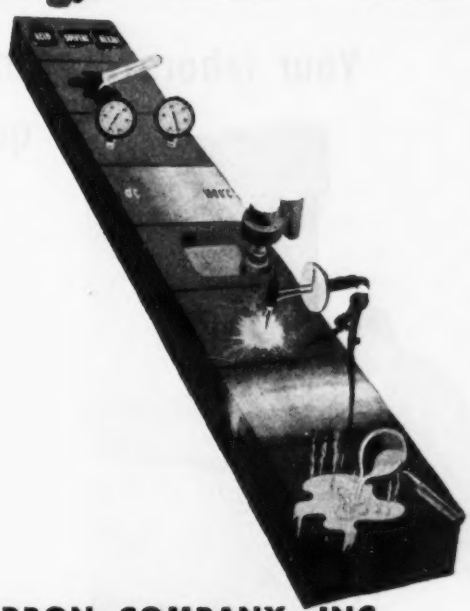

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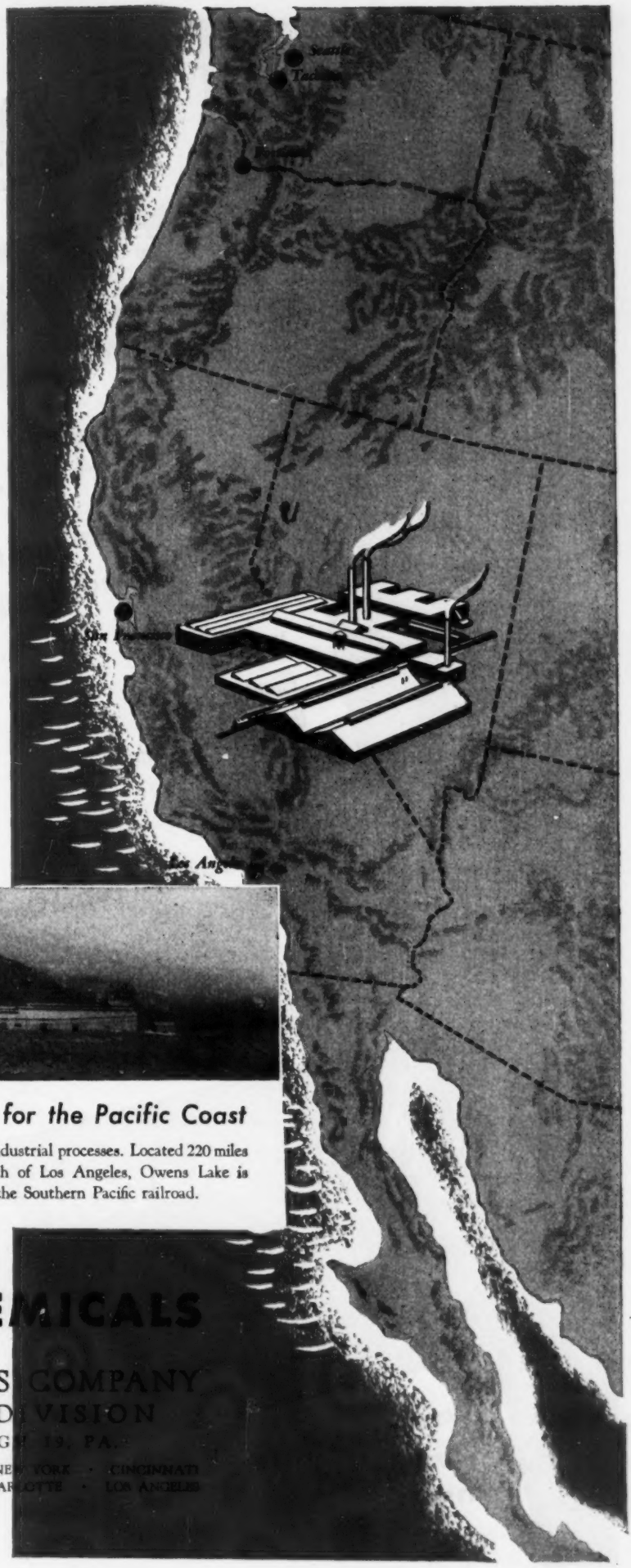
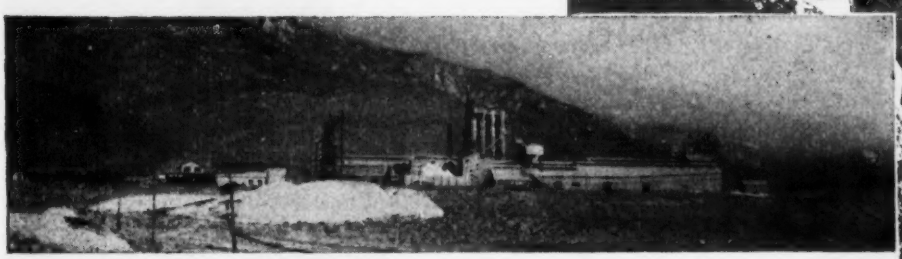
The entire nation looks ahead to the continued expansion of Pacific Coast industry, so necessary to America's future. Columbia is proud to join with the hundreds of industries which will help to add this important chapter to American industrial history.

As announced recently, the Pacific Alkali Company has become a Columbia division. Pacific's rich alkali deposits provide the source of an abundance of essential industrial chemicals. And the production and distribution facilities of Columbia combine to guarantee that these needs of industry, up and down the Pacific Coast, will be efficiently and economically served.

This expansion of Columbia facilities is another example of its progressive policy which seeks not only to serve the immediate needs of its customers throughout the nation, but to anticipate them to as great an extent as possible.





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NEWS OF THE MONTH

War Outlook Tightens '45 Chemical Supply

Chemicals, oils, metals, textiles and foods are among those industries where the civilian economy will bear the brunt of the change in the war outlook.

Specifically in the chemical industry, which supplies practically every branch of manufacturing industry from steel manufacture to assault boat fabrication, the share of responsibility for intensified war production will be heavy.

Allocations for December reflected the drastic increase in military demands and the consequent sidetracking of civilian needs.

Production of smokeless powder and explosives is at peak levels and present production will not only have to be maintained but exceeded either by more intense use of available facilities or the addition of new facilities. Phenol, toluol, nitric acid producers will be under extremely heavy pressure as production is pressed to supply the Allied Armies in France.

An intensified jet plane program will call for increased supplies of special metal alloys. The chemical requirements of this and other programs will result in a steadily rising scale of chemicals production during 1945.

The problem of obtaining sufficient manpower to meet the new production requirements will pose particularly difficult problems. The chemical industry enters this new phase of the war with its supply of unskilled as well as technical personnel already stretched tightly over existing production tasks.

The War Production Board's announced policy is to maintain production for at least a year at levels retained during the last two months. This will result in no further restrictions over chemical allocations beyond those put in effect during the last quarter.

Cartel Registration Bill Favored

Prospects for drastic legislative steps to prohibit participation by American companies in foreign cartels have dimmed as Senator Harley M. Kilgore leading Congressional proponent of cartel curbs, indorsed the principle of international cartel registration and Senator Joseph C. O'Mahoney, cartel registration bill author, said he will introduce his measure again next session without change.

Senator Kilgore, who has headed the special Senate military affairs subcommittee on cartels, disclosed plans to issue a further report before the conclusion of this Congress, which would substantiate the need for legislative action. At the same time, Senator Kilgore said he has no immediate plans to introduce an anti-cartel proposal but will defer a legislative move until further study of the O'Mahoney bill has been possible.

"The O'Mahoney bill to register cartels goes a long step in the right direction," Senator Kilgore said. He made the distinction between "legitimate trading agreements between private companies" which are not in violation of the law and agreements which contemplate violation of the Sherman Anti-Trust Law and which are entered into secretly.

Both Senator O'Mahoney and Senator Kilgore strongly denounced restrictive agreements between private companies, and Senator Kilgore said he hopes to convince the American public of the dollars and cents cost of unlawful cartel activities.

Business assistance in formulating a Government policy in cartels was called for by Senator O'Mahoney who indicated past difficulties in getting business to take a stand on the subject.

New U. S. Dye Markets Foreseen

Dutch textile sources reported that a potential $10,000,000 market for American dyestuffs exists in Holland.

Noting that prior to the war nearly all dyestuffs sold in the Netherlands were produced by A. G. Farben of Germany and sold through a monopoly granted the Nazi firm by the Dutch Government, they said it was expected no such cartel will exist after the war.

The imports of dyestuffs in 1939 by the Dutch industry totaled 25,862 tons and was valued at $9,200,000. After the war the Dutch industry expects to expand, these sources asserted, and it is expected that the imports of dyestuffs will grow accordingly.

Directors Named For Universal Oil

Four directors for Universal Oil Products Co., have been elected, the Guaranty Trust Co., trustee of the company's stock, has announced.

The new directors of the company, recently put in trust for the American Chemical Society by the oil companies which formed it, are: Thomas W. Bowers, New York attorney; Guy E. Reed, vice president of the Harris Trust & Savings Bank, Chicago; Ralph S. Harris, New York attorney, and Kenneth H. Rockey, a director of Philip Morris & Co., Ltd. Joseph G. Alther, also a director, will continue as operating vice president.

Georgi Appointed to Pennsylvania Salt

Edmund A. Georgi, formerly manager of technical development of the papermakers chemical department, Hercules Powder Company, has joined the research and development of the Pennsylvania Salt Manufacturing Company as director of the special products division, according to announcement by Dr. S. C. Ogburn, Jr., manager of research and development.

American Scientists Assist Research in Egypt

Dr. Maurice L. Tainter, director of research, and Dr. Chester M. Suter, director of chemical research of the Winthrop Chemical Company, Inc., Rensselaer, N. Y., and New York City, have arrived in Cairo to assist in new research on tropical diseases on invitation of the Egyptian government, it has been announced. The two American scientists will spend several months abroad. Investigations will include studies on malaria, schistosomiasis, a liver disease and tracoma, an eye disease.

Chile Urges Higher Nitrate Prices

Intimation that raw material producing countries which are exporting heavily to the United States during the war will expect continuing heavy purchase after the war has been given by F. E. Hasler, Pan American Society president, speaking at a luncheon to Don Marcial Mora, Chile's ambassador to the United States.

Mr. Hasler pointed out that the war has given new life to the Chilean nitrate industry. About 1,000,000 tons will be shipped here this year, he estimated. "Had it not been for the Chilean supply," Mr. Hasler said, "we would have experienced a hunger in this country which would have made our present food rationing seem like child's play.

"One of the great problems which will face us with the end of the war," Mr. Hasler said, "is the need for continuing substantial purchases at fair profit prices of the export surpluses of primary producing countries whose subsistence depends upon their raw materials or agricultural products."

Record Chemical Output in '45

The American chemical and allied products industry in 1944 achieved the highest production level in history, reaching a record output of $8,300,000,000, or roughly about two and a quarter times what it was in 1939, the Chemicals Bureau of the War Production Board said.

Officials describe the chemical situation today as being in "good shape," crediting this largely to the actual construction of new facilities costing $1,500,000,000 since 1939. New facilities are currently being authorized at a rate of $12,000,000 a month, or an estimated $150,000,000 for 1945. The entire expansion program of $1,700,000,000, approved to date, was 88 per cent completed at the close of the year, it was disclosed.

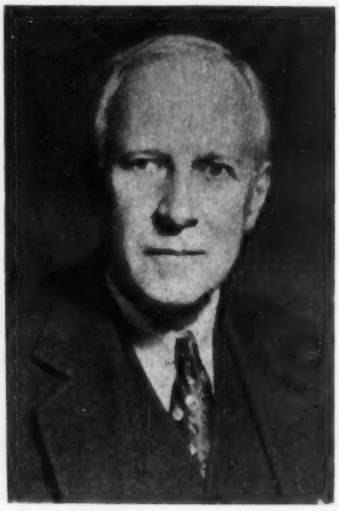
Kirk, Othmer to Edit Chemical Encyclopedia

Professor Raymond E. Kirk, dean of the graduate school and head of the department of chemistry, and Professor Donald F. Othmer, head of the department of chemical engineering, Polytechnic Institute of Brooklyn, have taken over the editorship of an Encyclopedia of Chemical Technology. This encyclopedia will be published by Interscience Encyclopedia, Inc., and distributed by Interscience Publishers, Inc., New York.

Chemical products and processes as well as the equipment of the chemical industry will be described in considerable detail. An alphabetical arrangement will be followed and the articles will be signed by the contributors. The tentative plan provides for the publication of 10 volumes of approximately 900 pages each. The first volume is scheduled to appear in April, 1946, and the tenth volume will appear in April, 1949.

An editorial office has been organized in close proximity to the Polytechnic Institute of Brooklyn. Miss Janet D. Scott, formerly with "Chemical Abstracts" and the Calco Chemical Division, American Cyanamid Co., will act as assistant editor in charge of this office. An editorial board is being selected.

Merz Re-elected S.O.C.M.A. President



August Merz, of the Calco Chemical Division of the American Cyanamid Company in Bound Brook, New Jersey, was re-elected president of the Synthetic Organic Chemical Manufacturers Association at their annual meeting December 7.

Sterling Forms Chemical Company

Formation of the Hilton-Davis Chemical Company Division of Sterling Drug Inc., New York, was announced by James Hill, Jr., president, in Cincinnati, Ohio, on January 2, when the $3,000,000 transfer of the Ohio manufacturers of chemicals and dyes to Sterling became effective, according to vote of the Hilton-Davis stockholders meeting last November 16. The transaction involved an exchange of stock on the basis of 3—¼ shares of Hilton-Davis for one share of Sterling, or approximately 45,000 shares of Sterling.

Louis A. Hoffman, president of Hilton-Davis since April 1942, has been elected a vice president of Sterling Drug Inc., according to Mr. Hill, who said the new Hilton-Davis Chemical Company Division would continue all policies of the company now dissolved, that the personnel would remain unchanged, and that plans had been completed for aggressive promotion of the chemicals and dyestuffs manufacture in the Cincinnati plant.

"Export possibilities in particular will be immediately broadened through facilities in other countries already established by Sterling Drug," Mr. Hill declared.

The new division will continue to manufacture atabrine, the anti-malarial, as well as atabrine powder, under a royalty-free license granted by Winthrop Chemical Company, a Sterling affiliate. Further expansion of Sterling's facilities for research in and manufacture of chemotherapeutic drugs is also made possible by the transfer, Mr. Hill said.

Activities of the U. S. Conciliation Service

Situations Disposed of in the Chemical Industry

Type of Situation	Number 1944 Nov.	1944 Oct.	1943 Nov.
Total	75	74	62
Labor Disputes	—	—	48
Strikes and Lockouts	5	9	*
Threatened Strikes	4	4	—
Controversies	36	36	—
Other Situations	—	—	14
Arbitrations	4	2	—
Technical Services	1	1	—
Special Services	7	7	—
Disputes Certified to National War Labor Board	18	15	—

* Information unavailable.

Chemical Consultants Discuss Murray Bill

The Murray bill (S. 1913), a congressional measure directed to post-war assistance for small business, was the nucleus of a discussion of government-business relations by the Association of Consulting Chemists and Chemical Engineers December 12. The association met for that purpose in the quarters of the Electrical Testing Laboratories, New York.

General Electric Organizes Chemical Department

A new department in the organization of the General Electric Co., to be known as the chemical department, has been created by the board of directors and Dr. Zay Jeffries, technical director of the company's lamp department, has been elected a vice president in charge President Charles E. Wilson has announced.

In making the announcement, Mr. Wilson stated the creation of the new department to become operative January 1 was in accordance "with the company's policy of modifying the organization structure to enable us to take full advantage of our opportunities for further growth."

The new chemical department will assume responsibility for the operations pertaining to the resin and insulating materials division and the plastics division of the appliance and merchandise department.

Professor Finch Decries Narrow Training for Scientists, Engineers

The wartime years have witnessed the output of a flood of narrowly trained technicians and engineering aides who cannot qualify as full-fledged engineering graduates, and who in the postwar period will create a difficult problem for in-

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U.S.I. CHEMICAL NEWS

January ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1945

Two New Resins Round Out U.S.I. Replacement Line

Complement Existing Resins in Solving the Shortage of Alkyds

While no relief is yet in sight for the currently tight situation on both natural and synthetic resins, there are some bright spots for manufacturers of civilian coatings. Not the least of these is U.S.I.'s non-critical S&W Aroplaz 1306, introduced some months ago and now complemented by S&W Aroplaz 1305 and 1309. These newer resins are designed specifically for those who want the harder, less flexible films produced by resins of lower oil content and who prefer not to blend with cold-cut solutions.

Gloss and Color Retention

S&W Aroplaz 1306 and the newer companion resins can now be used as alkyd resin replacements with a minimum sacrifice in most characteristics. Initial color is very pale and color retention is good. Gloss and gloss retention are outstanding. Drying, although not equivalent to an alkyd, is satisfactory for most jobs.

Versatility of Aroplaz 1306

Since all three of the new resins are soluble in all petroleum and coal-tar hydrocarbons,

(*Continued on next page*)

Wide Range of Products Made from Sub-standard Oranges

The production of new products from oranges, below fresh-fruit standards, has grown to the point where one orange products plant in California has had to expand its facilties to care for double the tonnage of oranges. Among the plant's products are oil-well drilling compounds, synthetic rubber anti-stick agents, and vitamin concentrates, most of which are produced from residues formerly discarded as waste.

Part of the pulp is processed to extract the pectin. In this process, pulp is treated with hydrochloric acid, and pressed. The liquid obtained is passed through a filter press, and the filtrate concentrated and treated with ethanol to yield a jelly-like precipitate. After separation of the alcohol in a drain tank, the mass of precipitate is broken up. The pieces of pectin are hardened, ground, dried, and bagged for shipment. Pulp residue is sold for feed.

Production of old-line by-products of oranges is not decreased by this further processing.

Three pounds of washed precipitated pectin (left) are required to yield a few ounces of dry, powdered pectin (right). Photo from The Exchange Orange Products Co., Ontario, Cal.

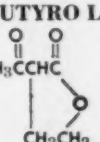
Interesting Future Predicted for Four New Organic Chemicals

Novel U.S.I. Intermediates Promise Valuable Short Cuts in the Synthesis of Drugs, Medicinals and Specialties

Taking their places well up on the list of war-born organic intermediates which are both paving the way to new products, and shortening the synthetic route to old ones, are the four new chemicals whose structural formulas are shown below. These new intermediates are methyl cyclopropyl ketone, alpha acetyl butyro lactone, acetyl propyl chloride, and 5-diethylamino pentanone-2. Products of U.S.I. pioneering in the application of the Claisen-type condensation, two of these new intermediates are already being used in substantial quantities. The synthesis of vitamin B_1 makes use of alpha acetyl butyro lactone, while 5-diethylamino pentanone-2 is an intermediate in the manufacture of atebrin.

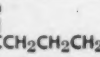
Below are the physical constants of each of these new chemicals. Samples are available on request.

α-ACETYL BUTYRO LACTONE



Mol. wt., 128. Sp. gr., 1.185-1.189 @ 20/20° C. Refractive Index, 1.460 @ 20° C. Boiling point, 121-122° C. @ 10 mm. Hg. abs. Colorless liquid. Suggested Uses: Organic synthesis.

ACETYL PROPYL CHLORIDE (5-Chloro Pentanone-2)



(*Continued on next page*)

A. E. Tongue to Direct U.S.I. Anti-Freeze Sales

Arthur E. Tongue

Arthur E. Tongue has been appointed Manager of Anti-Freeze Sales for U. S. Industrial Chemicals, Inc. He will be in charge of the sale of U.S.I.'s Super-Pyro Anti-Freeze, as well as its other automotive products.

Mr. Tongue comes to U.S.I. from the Chrysler Corporation, where, for the past eight years, he was in charge of Advertising and Sales Promotion for the Chrysler line of cars.

Butanol Reported To Boost Penicillin Yield

While penicillin can be extracted by ether, amyl acetate or chloroform, provided the aqueous solutions are sufficiently acid, penicillin is rapidly destroyed in a highly acid environment. Needed, then, is an extraction solvent which will function in less highly acidified solutions.

Research, recently reported by an English scientist, has shown that penicillin is most stable at a pH of 6.4; it has been discovered that normal butyl alcohol will efficiently extract the penicillin from such a medium.

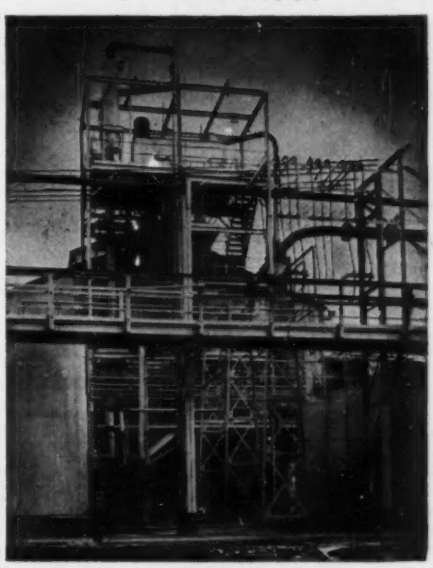
Although these findings are based upon small-scale tests, the improvement in efficiency of the new method is described as "enormous."

Surface Hydrolysis Makes Plastics Solvent Resistant

Cellulose ester plastics exhibit a tendency to swell, distort, and become tacky, when brought into contact with certain solvent plasticizers, and solvents such as acetone.

It has been discovered that after surface hydrolysis of the plastic, the surface thus converted back toward cellulose is highly resistant to the action of such solvents. Surface hydrolysis is obtained by dipping the plastic in a solution of sodium hydroxide and a softening agent, such as alcohol.

Plastics so treated will withstand cleansing operations impracticable for untreated plastics and the physical qualities of the plastic, are apparently unaffected by the treatment.



U.S.I. plant where acetyl propyl chloride is manufactured from α-acetyl butyro lactone. The acetyl propyl chloride is then reacted, via a Claisen condensation, with diethyl amine to give 5-diethylamino pentanone-2. The refining still and column can be seen in the foreground.

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January ★ **U.S.I. CHEMICAL NEWS** ★ 1945

Improvements Made in U.S.I.'s Curbay B-G

With its riboflavin potency improved to 150 micrograms per gram, new, improved Curbay B-G assumes an even more important place among poultry and livestock feed supplements.

In addition to its increased riboflavin content, Curbay B-G contains generous amounts of other B-complex factors: pantothenic acid, niacin, pyridoxine, biotin, as well as folic acid. Curbay B-G is a very economical source of these factors.

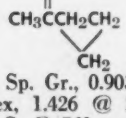
A new manufacturing process has also greatly reduced the product's tendency to dust.

New Organic Chemicals

(*Continued from preceding page*)

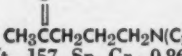
Mol. wt., 120.5 Sp. gr. 1.054 @ 20/20° C. Refractive Index, 1.440 @ 20° C. Boiling point, 71-72° C. @ 20 mm. Hg. abs. Colorless liquid. Turns dark on storage in presence of air. Suggested Uses: Organic synthesis.

METHYL CYCLOPROPYL KETONE



Mol. wt., 84. Sp. Gr., 0.903 @ 20/20° C. Refractive Index, 1.426 @ 20° C. Boiling point, 111-113° C. @ 760 mm. Hg. colorless liquid. Suggested Uses: Organic synthesis.

5-DIETHYLAMINO PENTANONE-2
(Noval Ketone)



Mol. Wt., 157. Sp. Gr., 0.865 @ 20/20° C. Refractive Index 1.435 @ 20° C. Boiling Pt., 90-92° C. @ 20 mm. Hg. abs. Colorless liquid. Turns dark on storage in contact with air. Suggested Uses: Organic chemical synthesis.

Claims Color-Fast S ing For Paper and extiles

In the past, resin emulsions used for sizing paper, fabrics, leather and other flexible materials have been subject to two serious defects, according to a recently granted patent. Such emulsions are claimed to yellow with age, and under certain conditions to become relatively inflexible.

According to the inventors, emulsions of hydrogenated ester gums are free from both of these adverse factors, being compatible with most plasticizers and overcoming the tendency to yellow with age.

The hydrogenated ester gums used in these emulsions are prepared by hydrogenating rosin and then reacting it with ethanol, diethylene glycol or other aliphatic alcohol. Another method of preparation first reacts the rosin with the alcohol to form ordinary ester gum, then hydrogenates the ester gum.

Two New Resins

(*Continued from preceding page*)

finishes prepared with them are easily adjusted for brush, spray, dip or other application method. Set time of films may be controlled by the selection of solvents from among a wide range. Acid value has been lowered so that these resins may be used with any pigment except a highly reactive one.

Because of their oil content, these resins are particularly suitable for use as general-purpose vehicles in architectural finishes, enamels for interior use, and exterior applications where maximum durability is not a factor, and in metal-finishing enamels. However, they may be modified to yield other characteristics. Enamels of high durability for exterior finishing may be produced by the addition of bodied oils, while addition of Ester Gum or other hard resins, cold-cut, produces extremely hard films for use as furniture or floor varnishes and toy and hardware enamels.

RESIN SPECIFICATIONS

AROPLAZ	1306 65% SOLIDS in MS	1306 75% SOLIDS in MS	1309 75% SOLIDS in MS	1305 85% SOLIDS in MS
Acid Value (Plastic)	10-15	10-15	10-15	10-20
Color (GH 1933)	7-9	7-9	8-10	8-10
Viscosity (GH)	T-V	Y-Z_1	W-Y	Z_1-Z_2
Weight/Gal. @ 25C	7.6 lbs.	7.8 lbs.	8.0 lbs.	8.2 lbs.
Reportable Oil Content (Prox.) on plastic resin	65%	65%	60%	44%

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

A new synthetic detergent of the substituted sodium alkyl sulfonate type has been announced. The product contains 35% organic material and will be of interest to those requiring high water solubility with good detergent, emulsifying and wetting properties. **(No. 888)**

U S I

Simulated hammered finishes, claimed to produce hammered silver, copper and bronze effects on most metals or phenol-formaldehyde molded plastics, are back on the market for industrial application. **(No. 889)**

U S I

Bonding plastics to a wide range of materials is the announced purpose of a new adhesive line. Among the materials mentioned are glass, metals, rubber, fabrics, wire, lead and tin foil, and cellulose. **(No. 890)**

U S I

To fill drums in a horizontal position is the purpose of a new funnel offered to save time and labor in this otherwise troublesome job. The new filler clamps to the drum chine; can't tip or spill. **(No. 891)**

U S I

Metallic, high-temperature packing designed for aircraft, is now available for general industrial use. According to the manufacturer, this woven metal tape will give service at 2,000 deg. F., is corrosion-resistant and non-magnetic. **(No. 89)**

U S I

An edible emulsifying agent, claimed to be nontoxic, practically odorless, dispersible in hot water, and completely soluble in alcohols and hydrocarbons, is announced. Product is thought to be of special interest to the food, pharmaceuticals, and cosmetic industries. **(No. 893)**

U S I

To color metals and alloys of almost any type, with almost any color, and in iridescent and matte effects, a new line of coloring salts and solutions is offered. Among the features claimed are increased corrosion resistance. **(No. 894)**

U S I

Protection against skin irritation is promised by the manufacturer of another new cream, who describes it as providing the skin with a water-removable armor against industrial irritants. **(No. 895)**

U S I

Marking ink in powder form, packed in containers which hold enough to make one quart, is claimed to wash out of fabrics on which it may be spilled. In blue, purple, green and red. **(No. 896)**

U S I

Instant anti-skid protection is described as one of the qualities of a pair of new dry-cleaners for floors. Both are said to reduce accidents and fire-hazard. **(No. 897)**

U S I

To protect uncured rubber and oils from the deleterious action of sunlight, a new alkylated polyhydroxy phenol is on the market. **(No. 898)**

U S I

Tough paperboard drums, claimed to have held up under drop tests more severe than ICC tests, are offered for packing liquids. **(No. 899)**

U.S.I INDUSTRIAL CHEMICALS, INC.

60 EAST 42ND ST., NEW YORK 17, N. Y. — BRANCHES IN ALL PRINCIPAL CITIES

ALCOHOLS
Amyl Alcohol
Butanol (Normal Butyl Alcohol)
Fusel Oil—Refined

Ethanol (Ethyl Alcohol)
Specially Denatured—all regular and anhydrous formulas
Completely Denatured—all regular and anhydrous formulas
Pure—190 proof, C.P. 96%, Absolute
*Super Pyro Anti-freeze
*Solox Proprietary Solvent

***ANSOLS**
Ansol M
Ansol PR

*Registered Trade Mark

ACETIC ESTERS
Amyl Acetate
Butyl Acetate
Ethyl Acetate

OXALIC ESTERS
Dibutyl Oxalate
Diethyl Oxalate

PHTHALIC ESTERS
Diamyl Phthalate
Dibutyl Phthalate
Diethyl Phthalate*

OTHER ESTERS
*Diatol
Diethyl Carbonate
Ethyl Chloroformate
Ethyl Formate

INTERMEDIATES
Acetoacetanilide
Acetoacet-ortho-anisidide
Acetoacet-ortho-chloranilide
Acetoacet-ortho-toluidide
Acetoacet-para-chloranilide
Ethyl Acetoacetate
Ethyl Benzoylacetate
Ethyl Sodium Oxalacetate

ETHERS
Ethyl Ether
Ethyl Ether Absolute—A.C.S.

FEED CONCENTRATES
*Curbay B-G
*Curbay Special Liquid
*Vacatone 40

ACETONE
Chemically Pure

RESINS
S&W Ester Gums—all types
S&W Congo Gums—raw, fused & esterified
S&W *Argalaz—alkyds and allied materials
S&W *Arofene—pure phenolics
S&W *Arochem—modified types
S&W Natural Resins—all standard grades

OTHER PRODUCTS
Colladions — Ethylene
Ethylene Glycol — *Indalone
Nitrocellulose Solutions — Urethan

dustry, Professor James Kip Finch says in his annual report as acting dean of the Columbia University Engineering School.

They are, he points out, the product of normal programs of engineering study, shortened, accelerated, and abbreviated to meet war requirements, and special courses organized to train such engineering aides and assistants to meet the immediate demands of a mechanized war and of war industries.

"This situation and these trends are especially disturbing in view of the fact that our scientific and engineering schools, because of war conditions, have been able to turn out very few graduates trained in the upper levels," Professor Finch declares.

"While our country has an oversupply of partially trained personnel in the lower vocational-technological levels, and many schools are planning to add to this surplus, there has been a continued decrease in the number of men available in the higher, professional and research levels. Yet it is exactly this type of well-educated engineering graduate, trained in research, which American industry so urgently needs."

Hedgepeth Named MCA Committee Head

L. L. Hedgepeth, manager of the technical service department of the Pennsylvania Solvent Manufacturing Company, has been named chairman of the carboy committee of the Manufacturing Chemists Association.

Merck Denies Charge

Merck & Co., Inc., issued a statement denying the Government's charge of insufficient labeling of "Doryl," a drug used by physicians, and in hospitals in postoperative cases, and also in glaucoma treatment. The company pointed out that the charge was technical in nature and did not allege any intentional violation of the law.

Improper use of the drug which is put up in three forms—solution, crystalline substance, and tablets—was wholly accidental the company holds, and not due to misbranding as charged.

CALENDAR OF EVENTS

AMERICAN CHEMICAL SOCIETY, Jointly New York Section in charge, W. H. Nichols Medal, March 9.
AMERICAN INSTITUTE OF MECHANICAL ENGINEERS, Pennsylvania Hotel, New York, Feb. 18-22.
AMERICAN SOCIETY FOR TESTING MATERIALS, Committee Week, Hotel William Penn, Pittsburgh, Pa., Feb. 26 to March 2.
CHEMURGIC CONFERENCE, 11th Annual, Hotel Statler, St. Louis, Mo., March 28-31.
COMPRESSED GAS MANUFACTURERS' ASSOCIATION, the 32nd Annual Meeting and Wartime Conference, Waldorf-Astoria Hotel, New York, Jan. 22-23.
DRUG, CHEMICAL AND ALLIED TRADES SECTION, N. Y. Board of Trade, Annual Dinner, Waldorf-Astoria Hotel, New York, March 15-20.
FEDERAL WHOLESALE DRUGGISTS ASSOCIATION, Hotel Pennsylvania. New York, N. Y., March 8-10.
GYPSUM ASSOCIATION, Annual Meeting, Bismarck Hotel, Chicago, Ill., February 14.
SOCIETY OF CHEMICAL INDUSTRY, Baekeland Memorial Meeting, New York, N. Y., February 9.
SYMPOSIUM ON MAGNETIC PARTICLE TESTING, Philadelphia District, Hotel Benjamin Franklin, Philadelphia, Pa., Jan. 22.
TECHNICAL ASSOCIATION OF PULP & PAPER INDUSTRY, Annual Meeting, Commodore Hotel, New York, Feb. 19-23.

Stern Joins Polytechnic Research Staff

Under the direction of Dr. Kurt G. Stern, formerly associated with the department of physiological chemistry at the Yale University School of Medicine, installation of a new laboratory at the Polytechnic Institute of Brooklyn equipped with instruments heretofore used chiefly in biochemical research.

Dr. Stern, noted for his contributions to enzyme chemistry, recently was awarded a grant totaling $19,000 for fundamental research on proteins and highpolymers from the Carrie S. Scheuer Foundation of New York. The grant was available for use at any institution Dr. Stern chose. In selecting the Polytechnic Institute, Dr. Stern plans to work in close cooperation with the research group of Dr. Herman F. Mark.

Citric Acid Sales Rule Given

The Office of Price Administration has ruled that sales of citric acid by Citro Chemical Company of America, Maywood, N. J., to the Emerson Drug Company, Baltimore, Md., shall be exempt from price control for so long as the Emerson Drug Company agrees to absorb any increased costs to it resulting from such exemption and that it will not increase its prices nor apply for any increase in its maximum prices for sales of any of the products or services, wholly or in part by reason of such increased costs of citric acid.

GALEX, one of the New Chemicals products described in the October issue, was erroneously listed as a product of Givaudan-Delawanna, Inc. It is a product of the National Rosin and Size Company, RKO Building, Radio City, New York.

Paroils
AMECCO CHLORINATED PARAFFINS
AMECCO CHEMICALS
PAROILS MAY BE THE ANSWER TO YOUR PROBLEM
Chlorinated Paraffins are supplied as non-volatile liquids, soft solids, or hard brittle resins, depending upon the chlorine content.
Chlorinated Paraffins are compatible with most plastics, resins and synthetic rubbers with the exception of the cellulose derivatives and are soluble in most organic solvents including the hydrocarbons.
They are used as plasticizers and resins in protective coatings, inks, plastics, synthetic rubbers and coated fabrics; as additives in lubricants and as chemical intermediates.
We will be glad to furnish further information on request.
AMECCO CHEMICALS, INC.
NEW YORK SALES OFFICE • MAIN OFFICE AND PLANT
60 EAST 42nd STREET, NEW YORK 17, N.Y. • 75 ROCKWOOD STREET, ROCHESTER 10, N.Y.
ESTABLISHED 1919

Facilities Expanded For Sulfuric Acid Production

A revised list of new and expanded facilities for the production of 550,200 additional tons of sulfuric acid annually, which have been approved by the War Production Board, was presented to the Inorganic Acids Industry Advisory Committee at a recent meeting, WPB has reported.

Companies expanding their present facilities and their new capacities are as follows: General Chemical Co., Calumet, Ill., 40,000 tons; E. I. du Pont de Nemours Co., East Chicago, Ind., 36,000 tons; Stauffer Chemical Co., Hammond, Ind., 43,200 tons; General Chemical Co., St. Louis, Mo., 35,000 tons; General Chemical Co., Cleveland, Ohio, 50,000 tons; General Chemical Co., Newell, Pa., 50,000 tons.

Companies building new plants and their capacities are: Monsanto Chemical Co., Monsanto, Ill., 72,000 tons; National Lead Co., St. Louis, Mo., 72,000 tons; E. I. du Pont de Nemours Co., Penn's Grove, N. J., 80,000 tons; Volunteer Ordnance Works, Chattanooga, Tenn., 72,000 tons.

The committee recommended that no acid facilities be considered in addition to the above mentioned group unless the Ordnance Department can prove the necessity of such facilities, WPB said.

Approximately 1,200 additional tank cars for the movement of sulfuric acid comprised of 600 new cars and 600 converted cars, will be available to the industry and to Army Ordnance in the near future, the committee was told by WPB officials. It is estimated that this quantity will be adequate to meet all expected requirements, WPB said.

Potash Chloride Program Retarded

The program for conversion of potassium chloride to potash sulfate in the Louisville, Ky., plant of the Rubber Reserve Company of the Reconstruction Finance Corporation, has been interrupted by a breakdown of the hydrochloric acid producing facilities, the War Production Board told the Potash Producers Industry Advisory Committee at a recent meeting. The program was initiated in November for the purpose of supplementing the supply of potash particularly in the tobacco producing area, WPB said.

Match Manufacturers IAC

Approximately 175,000,000,000 strike-anywhere matches and 125,000,000,000 book matches will be available for civilian use in 1945, Chemicals Bureau officials told the Match Manufacturers Industry Advisory Committee at a recent meeting, the War Production Board has reported.

Of the 1945 match production, the military will require the entire output of strike-on-box matches and 35 per cent of the book matches, WPB said. Virtually the entire output of strike-anywhere matches will continue to be available for civilian consumption, they added.

WPB requested the industry to submit detailed statements of its labor problems. The War Manpower Commission and WPB will cooperate in an attempt to provide more labor for the match industry, WPB officials said.

The next meeting of the Match Manufacturers Industry Advisory Committee was scheduled for January 16, 1945.

Knapp Heads Naval Stores Research

I. E. Knapp has been appointed head of the Naval Stores Research Division of the Bureau of Agricultural and Industrial Chemistry of the Agricultural Research Administration of the Department of Agriculture.

AMERSIL*!
3092°F
MELTING POINT
2700°F
FOR SHORT PERIODS
2100°F
CONTINUOUSLY
COEFFICIENT OF EXPANSION IS 0.000000054 PER DEGREE OF C.
Amersil* (fused silica) possesses many advantages over all other materials when used in the fabrication of many pieces of chemical and industrial plant equipment.
It withstands, operating temperatures of 2100°F. with peaks up to 2700°F. permissible for short periods. Its coefficient of expansion is 0.000000054 per degree of C. over a range of 0° to 1,000°C. This is 1/34 that of copper, 1/17 that of platinum, 1/9 that of tungsten. It is inert to acids, even when hot and concentrated—except hydroflouric (at all temperatures) and phosphoric above 270°F. and is unaffected by the halogens, with the exception of flourine. It does not contaminate the acids handled. It withstands severe thermal shocks, is light in weight and provides unique electrical insulation values.
A new Amersil* Catalog is now on the press. Write today—on your business letterhead, please—and reserve a copy.
* The registered trade name of the only American manufacturer of a complete line of Fused silica products.
AMERSIL COMPANY Inc.
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60 Wall Tower
New York 5, N. Y.

COMPANIES

Pullman Buys M. W. Kellogg

Purchase of the M. W. Kellogg Co., privately-owned industrial engineering and contracting firm with total reported assets of more than $25 million, by Pullman, Inc., for cash has been announced by D. A. Crawford and M. W. Kellogg, presidents, respectively, of Pullman and the Kellogg organization.

The Kellogg company, a leader in the field of petroleum and chemical engineering, will be operated by its present staff of officers and employes as a separately

incorporated member of the Pullman group of companies, the announcement said. Mr. Kellogg has been elected a director of Pullman.

M. W. Kellogg

The price to be paid for the entire outstanding stock of Kellogg is "to be finally determined in accordance with conditions of the sale contract," according to the statement.

The Kellogg company, according to the latest available figures, has an authorized capitalization of $5 million of 7% cumulative preferred stock, 5,760 no par class A shares, 100,000 no par class B shares and 1,940 shares of $100 par value common stock. The number of outstanding shares of each class is not available.

"By acquisition of the Kellogg Co.," the announcement said, "the Pullman group will participate in more diversified lines of engineer-contracting, research and manufacturing activities than heretofore. From the point of view of the Kellogg company, the change is expected to open new opportunities for service to the oil refining and other industries through substantially expanded facilities made possible by increased resources. It also carries the prospect of expansion into other fields where these enlarged facilities may be applied."

The Kellogg Co.'s refinery installations are now operating in all parts of the world.

Cabot Carbon to Purchase Retort Chemical

Announcement has been made by Godfrey L. Cabot, Inc., Boston, that its subsidiary the Cabot Carbon Company would purchase the plant and facilities of the Retort Chemical Company, Gainesville, Florida. The transaction will be completed January 1, 1945.

The Boston headquarters of Godfrey L. Cabot, Inc., will act as selling agents for all retort chemical products to the rubber, paint, varnish, plastics, rope, cordage, and other industries.

No immediate plans for increasing the production of the pine tar, turpentine, charcoal, and miscellaneous wood products were announced, but it is understood that Cabot policy would be to increase capacity as demands warrant.

Rubber Output Announced

Two government synthetic rubber plants in Borger, Texas, and Louisville, Ky., built and operated by The B. F. Goodrich Company, have produced 300,000,000 pounds of manmade rubber since beginning operations, the company announces.

The combined output of the two copolymer plants is equivalent to the normal yield of approximately 28,000,000 Far Eastern rubber trees.

Hercules Canadian Sales

A new sales district in Canada, the establishment of a district office in Boston, and a change in the Far West sales territory, effective immediately, were announced by R. T. Yates, domestic sales manager of the Naval Stores Department, Hercules Powder Company.

The newly established Canada District of the Naval Stores Department will comprise the entire Dominion of Canada and Newfoundland, and headquarters for the new district will be in Wilmington.

New Apex Research Laboratory Opened

The new research laboratory of the Apex Chemical Co., Inc., Elizabeth, N. J., was dedicated December 20, in ceremonies attended by about 150 civic leaders, company executives, and representatives of other industries. Visitors later inspected the building and were shown the features of the building which include the office of the purchasing agent, the private laboratory of the director of research and chief chemist, individual laboratories of each 2 man research teams, as well as a large general laboratory for the research staff.

Columbia Chemical Acquires Pacific Alkali

In anticipation of greatly accelerated industrial activity throughout the Pacific Coast area after the war ends, the Columbia Chemical Division of the Pittsburgh Plate Glass Co. has acquired the plant and sales organization of the Pacific Alkali Co., E. T. Asplundh, vice president of the division has announced.

The alkali company has operated a plant for the past eighteen years at Bartlett, Calif. It manufactures soda ash, borax and sesqui carbonate of soda, which includes a group of household and industrial cleansing agents.

W. I. Gilliher, executive sales manager of Columbia Chemical, disclosed he has completed arrangements for opening a district sales office in San Francisco after the first of the year. This will be in addition to the Los Angeles office of the alkali company.

The site of the company's plant is

WANTED for INDIA!

Far-seeing chemical manufacturers are planning *now* to build a sound post-war trade with India.

Your key to this potent outlet is an outstanding Indian company, dealing extensively for 25 years in industrial chemicals, dyes, sizing materials, bleaches, fertilizers, etc. This well-established firm also has close connections with such industries as textiles, sugar, paper, glass, match, rubber, soap, etc.

Plan today for *your* share in India's huge market. Manufacturers desiring representation in India may obtain further information from our American representative:

MAX VAN PELS
441 LEXINGTON AVE.
NEW YORK 17, N.Y.

one of the richest natural deposits of alkali in the nation.

Michigan Chemical Increases DDT Output

Facilities of Michigan Chemical Corporation, St. Louis, Mich., for the production of DDT, new insecticide material, have been expanded to increase production substantially, according to an announcement by John L. Giles, vice president and general manager of the firm.

Celanese Develops Organic Phosphate Uses

Organic phosphates, produced by the Celanese Corporation, are finding an increasing number of applications, the latest of which include hydraulic fluids, plasticizers, lubricants and dust absorbents, it has been learned from the company.

As a result of the lengthening list of applications, demands for phosphates have increased. Although actual facilities have not been expanded technological developments and improved production techniques have stepped up output about 50 per cent.

Increased production is keeping pace with the development of additional uses for these materials. Although production facilities have not been greatly expanded technological developments and improved techniques have stepped up output about 50 per cent.

Of perhaps the greatest industrial significance is the use of these compounds, one of which is known as Lindol, as hydraulic fluids. Lindol, which is non-inflammable, non-corrosive and an excellent lubricant, has been successfully used as a hydraulic fluid in metal die-casting plants. Where high pressures are required explosions are a constant danger; there are also fire hazards due to leakages. Both hazards have been overcome by use of Lindol, it is reported. Moreover, despite its excessive costs (about twenty times that of ordinary fluids) die-casting plants are said to find it more economical in the long run because of the savings effected through prevention of hitherto frequent fires and explosions.

Company Notes

Allied Asphalt & Mineral Corp., 217 Broadway, New York, announce the appointment effective January 1, 1945, of the John H. Calo Co., 43 E. Ohio St., Chicago, as their agent in that territory.

Virginia Gas Industries, Inc., Richmond, has been issued a charter by the Virginia State Corporation Commission, to deal in liquefied or other gases, chemicals and equipment. Maximum capital of the firm is $19,920 and L. L. Parlett is president.

The Du Pont Company's Grasselli Chemicals Department has established offices in Tacoma, Washington, to serve the agricultural interests of the Northwest and California. C. G. Klotzberger, formerly special sales representative in Wilmington, Delaware, has been appointed the district sales manager. All activities of the Wenatchee, Washington, office have been transferred to Tacoma.

Donald R. Warren Company, Engineers of San Francisco and Los Angeles, have extended their engineering service into the fields of chemical and process plant design. Fred Lohse, formerly associated with Henry J. Kaiser Company has joined the staff.

The Diamond Alkali Company and the Harshaw Chemical Company announce the new ownership and management of the Western Technical Supply Co., Inc., 306 West Second Street, Wichita, Kansas.

Aromatics Division, General Drug Co. announce that as of January 6th, their offices are located at 125 Barclay St., New York 7, N. Y., The World-Telegram Building, in order to improve their facilities for better serving their customers. Their warehouse and laboratories will remain at 644 Pacific St., Brooklyn.

Celanese Corporation of America has announced that the name of the selling organization for its plastics products has been changed from Celanese Celluloid Corporation to Celanese Plastics Corporation.

Durex Plastics and Chemicals, Inc., North Tonawanda, N. Y., has filed with the Securities and Exchange Commission a registration statement covering 73,208 shares of its $5 par value common stock. Proceeds of approximately $2,100,000 will be used to provide additional postwar working capital.

Orbis Products Corporation, 215 Pearl St., New York, has announced the appointment of Agencia Continental de Comercio A. enP. as their exclusive Mexican representative. Their address is Jose Maria Iglesias 35, Apartado Postal 8919, Mexico, D. F. Lt. Commander R. L. Cahill has resumed his post as vice-president of Orbis Products, after a tour of duty with the Naval Reserve.

Trackson Company, Milwaukee, Wisconsin, has been awarded a second white star.

American Meter Company's Philadelphia plants received the Army-Navy "E" on November 27th.

Mathieson Reports Earnings

Mathieson Alkali Works, Inc., reports net profit for nine months ended September 30 of $828,801, equal to 85c a share, compared to $1,015,626, or $1.08 a share, in the same period last year.

SUPPLIERS SINCE 1838

COCOANUT OIL

Castor Oil
Corn Oil
Cottonseed Oil
Olive Oil and Foots
Peanut Oil
Rapeseed Oil
Sesame Oil
Sunflowerseed Oil
Lard Oil
Neatsfoot Oil
Tallow and Grease
Lanolin and Wool Fat

FATTY ACIDS

Red Oil
Special White Oleine
Stearic Acid
Rufat
Cocoanut F. A.
Corn F. A.
Cottonseed F. A.
Linseed F. A.
Peanut F. A.
Soya F. A.
Tallow F. A.

White Mineral Oil - Petrolatum - Superfatting Agent

VODOL A maize phosphatide which lowers surface and interface tension of oils and fats, stabilizes and prevents reversion, increases penetration and spread.

Soda Ash
Caustic Soda
Modified Soda
Sodium Metasilicate

Trisodium Phosphate
Disodium Phosphate
Monosodium Phosphate
Tetrasodium Pyro Phosphate

THE LAMEPONS unique surface active agents; prolific foam; high detergency and emulsifying powers; suitable for cosmetic and industrial use.

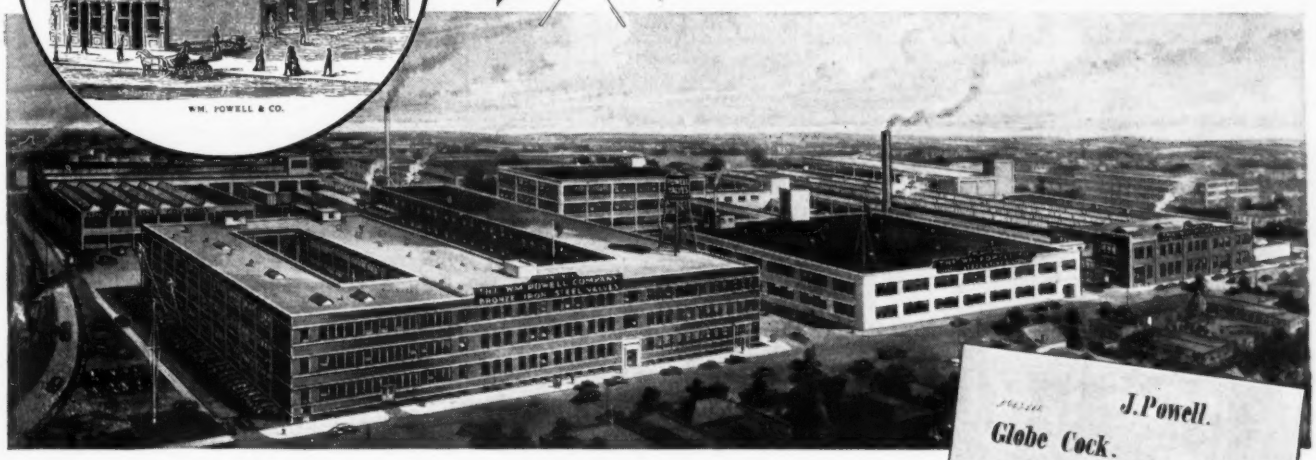
QUADRAFOS a stable polyphosphate for water conditioning and mild but effective detergency.

Starch and Dextrine

WELCH, HOLME & CLARK CO., INC.

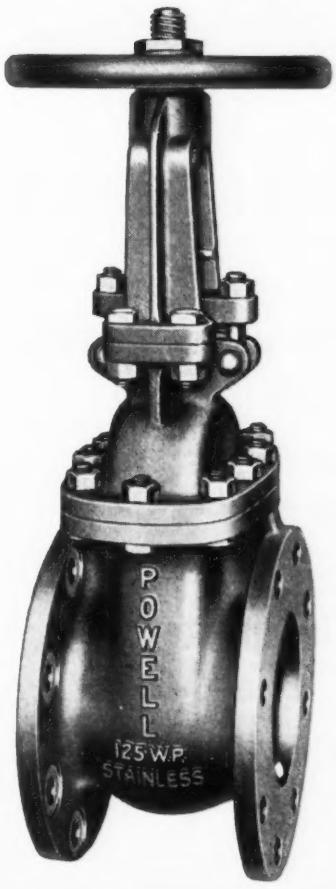
563 GREENWICH STREET, NEW YORK 14, N. Y.

99 Years of Leadership *in making valves for industry*



In a book on Cincinnati, published shortly after the Civil War, the following statement concerning the Wm. Powell Co. appears—"the Company, founded in 1846, manufactures the celebrated "Star" Regrinding Globe Valve, now in use in all parts of the country." Shown at the extreme right is the drawing used in 1865 to get the patent on this valve. The plant in which these valves were being made at that time is shown in the inset.

Today, in modern plant buildings covering many acres, the company is making a complete line of Globe, Angle, Gate, Check, Relief, Y, Non-return and other types of valves in bronze, iron, steel, pure metals and special alloys for corrosion resistance (catalogs on request).



In 1926, foreseeing the need for valves to meet new and exacting requirements of the fast growing Chemical and Process Industries, Powell established a Special Alloy Division. The function of this Division was to determine, through research, experiment and careful study of each individual installation, the types of valves to recommend and the materials other than the then commonly used bronze, iron and steel, from which they should be fabricated.

The result today is a complete Powell Line of valves for Corrosion Resistance. These include all necessary types and designs in a wide variety of pure metals and special alloys to control the flow of every known corrosive media.

The Stainless Steel Flanged End O. S. & Y. Gate Valve shown here is an example of this line. It is also available in a number of pure metals and special alloys. Write for complete details and booklet.

The Wm. Powell Co.

Dependable Valves Since 1846

Cincinnati 22, Ohio

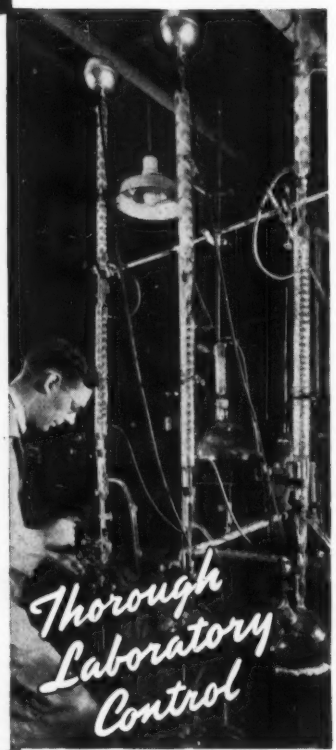
POWELL VALVES

Chemical Companies Earnings Reports Summarized

Company	Period	Taxes 1944-43	Net Profit 1944-43
Abbott Laboratories	6 mos. to June 30	....	$1,412,433 .....
Air Reduction Co. and Subsid. Co.'s	9 mos. to Sept. 30	$8,719,435– $9,835,590	$4,271,267– $5,265,340
American Agricultural Chemical Co.	Year to June 30	....	$1,819,418 .....
American Cynamid Co.	6 mos. to June 30	$7,100,000– $8,974,555	$2,222,659– $2,934,167
Atlas Powder Co.	6 mos. to June 30	$1,640,000	$694,511– $767,012
Davidson Chemical Corp. and Subsid. Co.'s	Year to June 30	$1,119,907	$1,380,724 .....
Dow Chemical Co. and Subsid. Co.'s	3 mos. to Aug. 31	$4,589,438	$2,229,700 .....

GIVAUDAN-DELAWANNA, INC. observed in December the twentieth anniversary of the corporation's operations in this country, though the house was founded in Geneva, Switzerland, in 1895, by Leon Givaudan and his brother, Xavier. Dr. Eric C. Kunz is president of the corporation.

ASSURED QUALITY IN FINE CHEMICALS



• o-Phenylene Diamine, Tech & Photo
• Phenyl Mercuric Acetate
• Potassium Thiosulfate, N. F. and C. P.
• Sodium Cyanate
•

The new Edwal Catalog and Price List No. 7-C (dated Jan., 1945) listing many new chemicals is now ready. Write for it today.

EDWAL

The EDWAL Laboratories, Inc.
732 FEDERAL STREET CHICAGO, ILLINOIS

ASSOCIATIONS

A. C. S. Directors Elected

Professor Charles A. Kraus of Brown University has been elected a regional director of the American Chemical Society to succeed Professor Arthur J. Hill of Yale. Dr. Edward R. Weidlein, director of the Mellon Institute for Industrial Research, has been re-elected a regional director. Dr. Willard H. Dow, president of the Dow Chemical Company, has been re-elected a director-at-large.

The Society has chosen the following councillors-at-large: Dr. Harry L. Fisher, U. S. Industrial Chemicals, Stamford, Conn.; Dr. Donald B. Keyes, director, Office of Production and Development, and chairman of Chemical Referee Board of CPRD, War Production Board; Professor Harry B. Weiser, Rice Institute, Houston, Texas; Dr. Robert R. Williams, chemical director, Bell Telephone Laboratories, New York.

Amer. Standards Ass'n Officers Re-elected

Henry B. Bryans, executive vice-president and director of the Philadelphia Electric Company, has been re-elected president of the American Standards Association. Other officers re-elected were: vice-president, George S. Case, of the Lamson & Sessions Company; chairman of the standards council, H. S. Osborne, of the American Telephone and Telegraph Company; vice-chairman of the standards council, E. C. Crittenden, of the National Bureau of Standards.

National Safety Council Officers Elected

The National Safety Council has announced officers recently elected:

General Chairman, James J. Dugan, Dir., Process Dept., Carbide & Carbon Chemicals Corp., South Charleston, W. Va. Vice-Chairman in Charge of Program, H. F. Gilbert, Safety Dir., American Cyanamid Co., 30 Rockefeller Plaza, New York, N. Y. Secretary, Allan L. Cobb, Supvr., Fire Prevention & Safety, Eastman Kodak Co., Rochester 4, N. Y. News Letter Committee, Harry W. Lundin, Chairman, Dir. of Safety & Plant Protection, Monsanto Chemical Co., 1700 2nd St., St. Louis, Mo. Engineering Committee, H. F. Reinhard, Chairman, Consulting Eng., Linde Air Products Co., 30

E. 42nd St., New York, N. Y. Health Committee, S. W. Gurney, Chairman, Laboratory Dir., Liberty Mutual Insurance Co., 175 Berkeley St., Boston, Mass. Data Sheet and Instruction Card Committee, R. S. Mackie, Chairman, Chemical Eng., General Electric Co., Nela Park, Cleveland, Ohio.

American Ceramic Society Organizes New Section

To expand the scope of The American Ceramic Society and increase its service to members in this area, a local section has been formed in Cleveland for northern and northeastern Ohio known as the Northern Ohio Section.

Regular meetings are planned during the coming season.

Affiliation with the Cleveland Technical Societies Council is contemplated.

DCAT Section Elects New Officers

At the organization meeting of the Drug, Chemical and Allied Trades Section of the New York Board of Trade Section's new Executive Committee held at the Drug and Chemical Club on December 13, the following Officers were unanimously elected to serve for the next fiscal year: Chairman, Guy L. Marsters, vice-pres., The Norwich Pharmacal Co.; Vice-Chairman, Harold H. Altshul, pres., Ketchum & Co., Inc.; Treasurer, Robert B. Magnus, vice-pres., Magnus, Mabee & Reynard, Inc.; Counsel, Carl M. Anderson, asst. to pres., Merck & Co., Inc.; Acting Secretary, Helen L. Booth.

E. T. T. Williams, the retiring chairman, automatically becomes a member of the section's advisory council which is composed of the last five ex-chairmen. In addition to Mr. Williams, the following past chairmen are also serving on this council: Victor E. Williams, S. B. Penick, Jr., John J. Toohy and Ralph E. Dorland.

The members previously elected John J. Toohy, manager of distribution for E. R. Squibb & Sons, as the representative of the section to the Board of Directors of the New York Board of Trade, and the following members of the Executive Committee to serve during the coming year. Harold M. Altshul, Ketchum & Company, Inc., Carl M. Anderson, Merck & Co., Inc., William H. Berg, The Borden Company, Carle M. Bigelow, Calco Chemical Div., American Cyanamid Co., Hugh S. Crosson, McKesson & Robbins, Inc., James DeCesare, White Laboratories, Inc., Frank G. Fanning, N. I. Malmstrom & Co., William F. George, Hooker Electrochemical Co., Harold C. Green, L. Sonneborn Sons, Inc., Philip B. Hoffman, Ortho Products, Inc., Grover C. Hollings, Eli Lilly & Co., R. J. Ingram, Bristol Myers Company, Joseph F. Kelly, Hagerty Bros. & Co., Elvin H. Killheffer, E. I. du Pont de Nemours & Co., Inc., Arthur J. Kinsman, Purepac Corporation, Robert B. Magnus, Magnus, Mabee & Reynard, Inc., Guy L. Marsters, The Norwich Pharmacal Co., Harold D. Pomeroy, G. S. Stoddard & Co., Inc., Lloyd I. Volckening, The Ivers-Lee Co., William J. Weed, Niagara Alkali Co.

S. O. C. M. A. Members Meet

The Synthetic Organic Chemical Manufacturers Association held its twenty-third annual meeting in New York, December 7. Annual reports were read, together with committee reports, and officers were elected.

Dr. Amos Taylor, director of the Bureau of Foreign and Domestic Commerce, was the guest speaker at the dinner.

Entomologists Meet

The joint meeting of the American Association of Economic Entomologists and the Entomological Society of America was held at the Hotel New Yorker, Dec. 13-15. One of the highlights of the program was a round table discussion of DDT. Chairman of this discussion was S. A. Rohwer, of the U. S. Department of Agriculture.

PERSONNEL

Continental Can Shifts Personnel

L. H. Skougor has been appointed general manager of Continental Can Com-

Aromatic Chemicals IN INDUSTRY

THE field of Aromatic Chemicals in Industry has widened considerably in recent years.

NO longer is the use of Perfumes restricted to the Soap, Cosmetic and Perfume Manufacturer.

PERFUMES are now widely used by such diverse manufacturers as: the rubber industry, the paper industry, the textile industry and many others.

FURTHER research is constantly being made both by us and by manufacturers of many diverse products.

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Among our many products the following are proving useful in numerous industries:

Butyl Phenyl Acetate
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Veratraldehyde
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Cinnamic Alcohol
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Ionone Methyl
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Linalool Extra

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Aromatics Division
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9 S. Clinton Street, Chicago 6 1019 Elliott Street, W., Windsor, Ont.

pany's production planning department. Mr. Skougor was formerly manager of the Jersey City plant. E. B. Dullinger has taken over the duties of factory manager of Continental's recently acquired Clearing-Owens plant in Chicago. J. Fedosky, Jr., who formerly held this position, is now a representative of the vice president in charge of manufacturing, and will handle special assignments, engineering problems and rehabilitation work in connection with the three former Owens-Illinois Can Company plants. R. J. Humes, formerly acting factory manager, has been appointed factory manager of the company's Wheeling, West Virginia, plant.

Frankfurter Back from L.A.

Otto Frankfurter, of the Heyden Chemical Corporation, returned to New York November 27 after a ninety-two-day business trip during which he visited all twenty of the Latin American republics and Puerto Rico. Together with his company's distributors, Mr. Frankfurter called on all wholesale druggists, the larger pharmacists, and industrial laboratories in the regions covered by his trip.

ACS Publication Staff Changes Made

James M. Crowe has recently been appointed Managing Editor of *Chemical and Engineering News* and Associate Editor of *Industrial and Engineering Chemistry (Industrial Edition)*. Mr. Crowe was formerly connected with the Heyden Chemical Corporation, and prior to that was Managing Editor of CHEMICAL INDUSTRIES magazine. He will make his headquarters in Washington.

Robert F. Gould has been named midwest editor on both *Industrial and Engineering Chemistry* and *Chemical and Engineering* News, with headquarters in Chicago. He comes to the ACS publication staff from the research department of Buckeye Cotton Oil Co., Chemical Pulp Division, Memphis, Tenn.

Reitmeier Joins Girdler Corporation

The Girdler Corporation, Louisville, Ky., has announced the appointment of Dr. Ronald E. Reitmeier to the post of director of research and development of its gas processes division. Dr. Reitmeier will have charge of the division's comprehensive development program, designed to improve gas purification and manufacturing processes.

Weinstein and Needle Head Research at Apex

Stanford L. Hermann, operating vice-president of the Apex Chemical Co., Inc., has announced the appointment of Sidney M. Weinstein as director of research and Haskell C. Needle as chief of bacteriological research.

Mr. Weinstein will supervise the technical staff in development of synthetics and various products to be used in the textile, leather, and pharmaceutical industries, at the company's new laboratories at 200 South First Street, Elizabeth, New Jersey.

Mr. Needle was previously director of research and chief chemist for the Waverly Sugar Company and has several patents on the production of lactic acid.

Carey Resigns OPA Post

James M. Carey, chief of the Heavy Chemicals and Coaltar Products Section of the Office of Price Administration, has resigned, effective December 18, to become manager for the International Products Company, a new firm just established to engage in the export and import of

CHEMICAL KESSCO PRODUCTS SPECIALTIES

TRIACETIN

PLASTICIZER and SOFTENER
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CELLULOSE ACETATE
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Personnel Notes

DR. CHARLES LATHROP PARSONS of Washington, D. C., for thirty-seven years secretary of the American Chemical Society, and former chief chemist of the U. S. Bureau of Mines, received on December 17, the honorary degree of Doctor of Science from the University of New Hampshire, where from 1892 to 1911 he was a professor of chemistry.

MR. FRANK HODSON formerly Metallurgist to the Board of Economic Warfare, Washington, and metallurgical representative on the 1943 United States Technical Mission to Brazil, finished his 18 months' work as technical advisor to the Brazilian Government in November. He has accepted a position as chief technical advisor to the Instituto de Fomento Industrial, Bogota, Colombia, a semi-Government organization responsible for new Industrial developments in that country including immediate work on a large new hydro electric installation, new steel plant, and chemical plants.

HENRY A. WIEDMAN and JAMES V. DEMAREST have been elected to the positions of vice president and secretary, respectively, according to an announcement by P. R. Dreyer, Inc., importers and specialists in essential oils and aromatic chemicals.

GEORGE WHITLEY has been appointed export manager of the Sherwood Refining Company, refiners at Warren, Pennsylvania, of white mineral oils and petrolatums, H. H. Sherwood, president, has announced. He was formerly export manager of Standard Coated Products Corporation. He will be located in the executive offices of the Sherwood Refining Company, Englewood, New Jersey.

WALTER A. GOLDTRAP has joined the staff of the chemical products department of the Phillips Petroleum Company, Bartlesville, Oklahoma. Mr. Goldtrap was formerly chief engineer of the Blaw-Knox Construction Company at Pittsburgh Pennsylvania, and was project manager for the Firestone Tire & Rubber Company during construction of the 60,000 ton co-polymer unit at Lake Charles, Louisiana. A J. DIRKSEN is now a member of the product development division of the same department. Mr. Dirksen was formerly associated with the University of Chicago and the Oldbury Electro-Chemical Company. SAM P. ROBINSON, recently employed as operating superintendent of the Mathieson Alkali Magnesium plant at Lake Charles, Louisiana, has also joined the staff of this department. C. M. HIMEL, who recently came to the Phillips company, will be connected with the research department at Bartlesville. He was formerly with the Barrett Division.

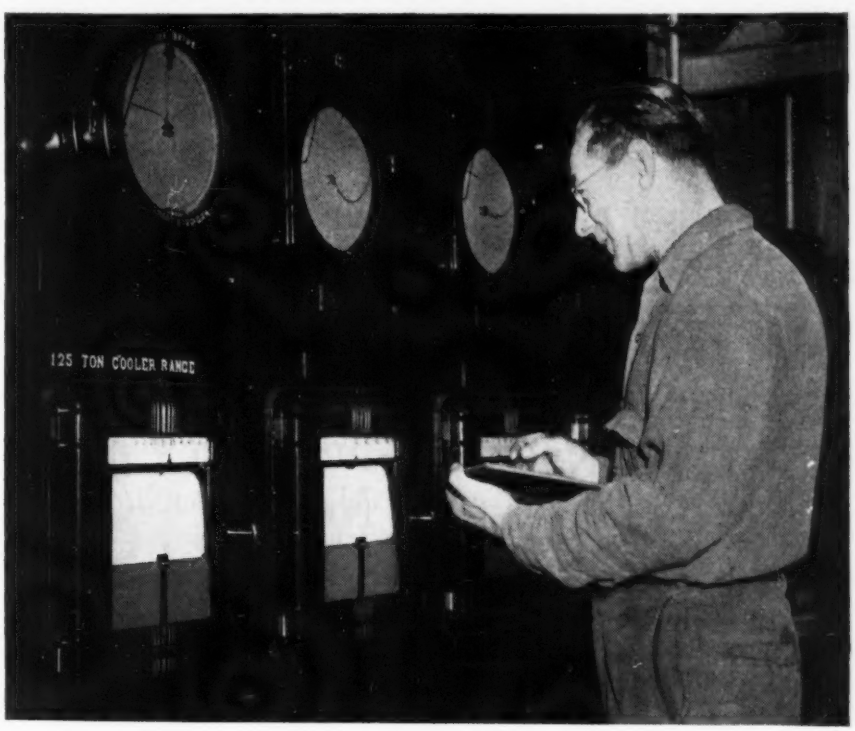
J. E. THOMAS has been named manager of cement sales in the Industrial Products Sales division of The B. F. Goodrich Company. Mr. Thomas will direct the sale of all adhesive materials handled by the division.

DR. THEODORE M. SWITZ, director of Hercules Powder Company's Export Department, has been elected to the board of the Netherlands Chamber of Commerce in New York for a three year term.

ANDREW KAUL III has been elected president of the Speer Carbon Company, the International Graphite and Electrode Corporation, and the Speer Resistor Corporation with offices at St. Marys, Pennsylvania. Mr. Kaul assumed his new duties on December first.

GEORGE F. DAVIS, sales manager of the Whiz Industrial Division of R. M. Hollingshead Corporation, will be sales manager of the Whiz Household Division in addition to his present position according to a recent announcement made by W. Stewart Hollingshead, vice-president. Mr. Davis will be assisted by G. C. CULSHAW.

WALTER M. ANNETTE, for twenty-six years manager of the New York City branch office of Hercules Powder Company, retired from the service of the company December 31, the company has announced.



Atlantic Refining Company Steps-Up Refrigeration Efficiency

Micromax Temperature-Difference Recorders are stepping up refrigeration efficiency at the Atlantic Refining Co. in a way that pays—they are helping to keep vital refrigeration temperatures absolutely at the desired points. They provide a detailed, easy-to-read record of temperature changes before the eyes of the refrigeration operator so he can *see* these changes as they develop and head them off. Micro-responsive, yet rugged, these Recorders are members of the famous Micromax family—known for their reliability and sensitivity. Send for Catalog N-33C, describing this equipment.

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Jrl Ad N-33C-706(1c)

LT. COL. JAMES E. BOUDREAU has been appointed advertising manager of Ethyl Corporation with headquarters in New York, following his release from duty with the Sixth Service Command, Earle W. Webb, president of the company, has announced.

HOLLAND W. SMITH, vice-president of Thompson, Weinman & Company, Inc., announces the appointment of Robert S. Radcliffe as sales promotion manager for the company's products in the middle western area.

WILLIAM V. FISHER, formerly vice-president and general manager, and with the firm for twenty-five years, was elected president of the Anchor Hocking Glass Corp., at a meeting of the Board of Directors.

PAUL E. KUHL, associate manager of the process division of the Standard Oil Development Company's Esso Laboratories, has been made assistant manager of the southern refineries and the Baltimore printing plant of the Standard Oil Company of New Jersey.

LAWRENCE E. STEELE, JR., research chemist in the acetate research section of the du Pont company at Waynesboro, Va., has been named research supervisor in the same section. He will supervise work on problems related to high-tenacity rayon yarn.

JOHN W. BOYER, chief of the Alcohol and Solvents Branch of the Chemicals Bureau, has resigned to establish himself in Washington as a consultant to the chemicals industry. He will be succeeded by FRANK E. BENNETT, chief of the Industrial Alcohol Unit of the Chemicals Bureau.

CHARLES M. SWITZER, director of cellophane production since 1935, has been appointed director of nylon production, E. I. du Pont de Nemours & Company

J. C. THOM has been appointed manager of sales of Westvaco Chlorine Products Corporation. He succeeds the late J. Rivers Adams.

ROBERT K. WATERMAN, sales engineer, has joined Maas & Waldstein Company, manufacturer of industrial finishes.

PHILIP BOWMAN, research chemist, has been named production manager at Cheplin Laboratories, Inc., subsidiary of Bristol-Myers Co.

LEO J. WALSH has assumed the duties of manager for General Mills vitamin product sales. He replaces FRANK DOWE, JR., who has resigned to become sales manager of vitamin products for Distillation Products, Inc., owned jointly by General Mills, Inc., and Eastman Kodak Company.

SYDNEY THAYER, JR., 1st vice president and treasurer of the Henry Bower Chemical Manufacturing Co., has returned after serving two years as a major in the United States Marine Corps.

RUDOLPH P. NEPTUN has been appointed field sales manager for the advertising department of S. B. Penick & Company.

M. N. BURLESON has been named industrial hygienist of the B. F. Goodrich Company, succeeding H. H. RADKE, who has been transferred to the chemical division. For the same company, MARCUS O. ORR has assumed the responsibilities of technical superintendent of Mill 4.

GEORGE KRIEGER, who has been in charge of the farm machinery division of the W. P. B. and who was special assistant to Donald M. Nelson, has resigned and will return to the Ethyl Corporation, where in his new position, he will be in charge of rural marketing and special development work.

RAY L. SPERBER joined the Vick Chemical Company on January 1. He recently held the position of sales manager of both Bayer Co., Ltd., and Sterling Products Ltd., Windsor, Ontario, and is now succeeded by J. C. CREIGHTON.

G. I. BARNES has been promoted to manager of the Senter Works of the Atlas Powder Company, on the retirement of W. E. EDDY. Mr. Barnes' former position, general manager of the Weldon Spring Ordnance Works, has been filled by D J. C. COPPS, previously chief engineer, Ravenna Ordnance Center.

E. S. NICKERSON, assistant division manager and director of sales of the

To Users of
ISOPROPYL ALCOHOL

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● Out of the MM&R research laboratory has come the perfect solution for overcoming the characteristic odor of Isopropyl Alcohol. The answer is NEUTRALIZER IA No. 1 MM&R! Specifically designed to depress and neutralize the objectionable odor of Isopropanol without distortion of subsequent additions of perfuming ingredients.

The use of this neutralizer in the suggested proportion — 1 ounce to 20 gallons of Isopropyl Alcohol — is not only economical initially, but also serves the added purpose of reducing the amount of perfume oil required to provide the odor identity common to your product.

Testing samples, suggested usage and schedule of prices immediately available.

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SINCE 1895...ONE OF THE WORLD'S GREATEST SUPPLIERS OF ESSENTIAL OILS
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Seattle, Portland, Spokane: VAN WATERS & ROGERS • Toronto: RICHARDSON AGENCIES, Ltd.

Fabrics Division, E. I. du Pont de Nemours & Company, is relinquishing his sales responsibilities in order to devote his entire time to managerial duties. M. N. NICKOWITZ, previously Fairfield products sales manager, will become director of sales, succeeding Mr. Nickerson. J. R. OWENS, who has been serving as special assistant to the director of sales, has been appointed Fairfield products sales manager.

RALPH J. ANDREWS has become associated with Wilson Carbon Company, New York, as director of research and product development.

JULIAN L. CULBERTSON, professor of chemical engineering at Washington State College, has been appointed visiting professor of chemical engineering at Columbia University for the Academic year 1944-45. Professor Culbertson who has been engaged in war research at Columbia since last June, will teach the unit operations of chemical engineering and chemical engineering thermodynamics.

OTTO EISENSCHIML, president of the Scientific Oil Compounding Company of Chicago, has written a fiction piece for the January issue of *Esquire* called War of the Rheingold. It looks ahead to the means of warfare that may be used by the Germans in a third world war, if they are allowed to continue scientific experimentation.

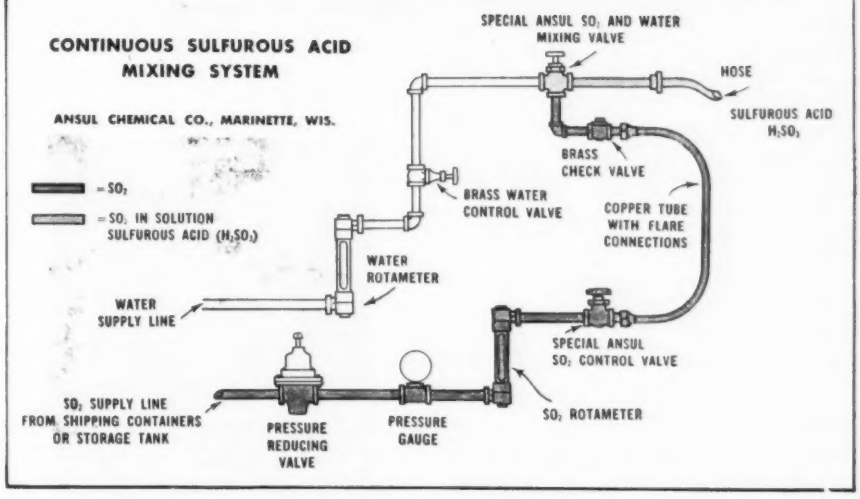
ROBERT B. SEMPLE was promoted from associate director of development department of the Monsanto Chemical Co., St. Louis, to manager of petroleum chemical sales, organic chemicals division, St. Louis. ARNOLD H. SMITH from manager of petroleum chemicals sales, Organic Chemicals Division of Monsanto in St. Louis, to assistant director of the foreign department, St. Louis.

F. H. Ernst, manager of the Du Pont rayon plant at Old Hickory, Tenn., has been appointed assistant production director of the rayon division of E. I. du Pont de Nemours & Co., it has been announced.

M. MERLUB-SOBEL, formerly manager of the research department of the Virginia-Carolina Chemical Company, will go to Palestine to become technical manager of the Palestine Potash Ltd., in February. He will be located in Jerusalem.

Appointment of DR. FRANKLIN D. SMITH as assistant director of development for Monsanto Chemical Co.'s organic chemicals division was announced recently by Osborne Bezanson, Monsanto vice president.

A SIMPLE WAY TO MAINTAIN A Constant SO_2 Concentration DEVELOPED BY ANSUL TECHNICAL STAFF


CONTINUOUS SULFUROUS ACID MIXING SYSTEM
ANSUL CHEMICAL CO., MARINETTE, WIS.
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SPECIAL ANSUL SO2 AND WATER MIXING VALVE
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SO2 SUPPLY LINE FROM SHIPPING CONTAINERS OR STORAGE TANK
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PRESSURE GAUGE
SO2 ROTAMETER

● Pre-mixing of water and liquid SO_2 . . . accomplished through the use of meters and a single, Ansul-designed valve installed at the juncture of the water and SO_2 supply lines . . . . permits constant control of the H_2SO_3 at any desired concentration.

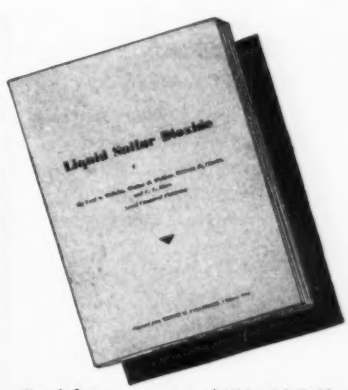
If you have need for an SO_2 mixing system for a specific application in your business, Ansul technicians will plan one for you.

LIQUID Sulfur Dioxide by ANSUL*

PHYSICAL PROPERTIES

Chemical formula	SO_2
Molecular weight	64.06
Color (gas and liquid)	Colorless
Odor	Characteristic, pungent
Melting point	−103.9° F. (−75.5° C.)
Boiling point	14.0° F. (−10.0° C.)
Density of liquid at 80° F.	(85.03 lbs. per cu. ft.)
Specific gravity	1.363
Density of gas at 0° C. and 760 mm.	2.9267 grams per liter (0.1827 lb. per cu. ft.)
Critical temperature	314.82° F. (157.12° C.)
Critical pressure	1141.5 lbs. per sq. in. abs.
Solubility	Soluble in water
Purity	99.9+% (by wt.) SO_2 (H_2O less than 0.01%)

*REG. U. S. PAT. OFF.



Send for your copy of "Liquid Sulfur Dioxide"—a treatise on the properties, characteristics, and industrial uses of Liquid Sulfur Dioxide—written by the Ansul Technical Staff.

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CHEMICAL SPECIALTIES NEWS

Metal Polishing Paste

In the formulation of metal polishes and cleaners, soap serves as a cleansing agent, a "wetting" agent and an emulsifying and stabilizing agent. A typical paste polish utilizing all these qualities of soap is described in the publication "Washing, Cleaning and Polishing Materials," by F. W. Smither of the National Bureau of Standards:

Chip soap	10	parts
Silica dust	20	"
Air-floated tripoli	20	"
Pine oil	2	"
Water	48	"

Dissolve the soap in the hot water, and add the previously mixed silica and tripoli with stirring; then add the pine oil, with stirring and run the hot mixture into suitable containers. The abrasives, silica and tripoli, should be of such fineness that practically all of it will pass through a No. 325 sieve.

Dow Announces New Weed Killer

Announcement of the commercial production of a new weed killer, dichlorphenoxyacetic acid, which can be effectively sprayed from airplanes over large acreages or used in conventional spraying equipment for small farms, home gardens and lawns, has been made by the Dow Chemical Co.

Other recent agricultural chemical developments include a spray designed to kill potato vines after maturity, reducing damage by blight, preventing "second growth" in the tubers and speeding the harvesting process; a spray to prevent premature dropping of fruit, and a spray to prevent dehydration of nursery stock.

Drawing Steel Cartridge Cases

The value of soap in metal drawing is re-affirmed by a recent Army Ordnance report on steel cartridge cases, by Lieutenant Colonel Harold R. Turner, in which he states that after experiments with practically every type of lubricant soap was adopted by more than fifty per cent of the manufacturers. The report says in part:

"The selection of proper lubricants to be used in drawing was quite essential to a successful result. It is undoubtedly true that somewhere in the program every type of lubricant which was offered was tried, and many of them were found to be satisfactory. In the majority of cases they were commercial products or modifications of then-existing commercial products. What appeared to be one of the best lubricants was a soap film on the draw piece. . . . Toward the end of the program, more than fifty per cent of the manufacturers were using this process. The requirement was that a uniform and continuous film of dried soap be present over the case, both inside and out, to provide lubrication both for the punch and the draw die. Some manufacturers used soap in combination with a liquid coolant, which was a light oil, since the presence of water destroyed the effectiveness of the soap."

Diedrichs Appointed to Arabol

Edward E. Diedrichs has been appointed director of sales of The Arabol Manufacturing Company, manufacturers of industrial adhesives, it has been announced by William A. Weaver, president. Mr. Weaver also announced the appointments of William G. Mollenberg as general manager of the midwestern division, and Charles J. Kasper as assistant to Mr. Mollenberg and superintendent of the plant in Cicero, Ill. The appointments are effective January 1, 1945.

Drug Trade Sets Up Export Liaison Group

A representative committee of manufacturers of drugs and pharmaceuticals has been formed by the industry to collaborate with the Federal government in matters involving foreign trade. The committee is composed of members of the three major organizations—the American Drug Manufacturers Association, the American Pharmaceutical Manufacturers Association, and the Proprietary Association.

The initial meeting of the group was held in New York October 10, immediately following the annual meeting of the Foreign Trade Council. Known as the Drug Industry Export Committee, it elected R. M. Dunning, of the Vick Chemical Company, representing the Proprietary Association, as chairman; F. Lejarza Saenz, of Mallinckrodt Chemical Works, A. P. M. A. representative, as vice-chairman; and John McGuire, of E. R. Squibb & Sons, A. D. M. A. representative, as secretary.

Organization of a committee which would act as a contact point through which the government would be able to reach the entire drug manufacturing industry has been in process for more than a year. It was first suggested by the Foreign Economic Administration, but the proposal was not adopted by the industry until recently.

Water-Proofing Solution For Paper

Wrapping, or other types of paper may be made water-proof by dipping or brushing with a simple soap-emulsified solution described in "The Book of Formulas." Easy to prepare, the emulsion contains:

Alum	12 oz.
Soap	2 oz.
Water	2 qts.
Beeswax	7½ oz.

Dissolve the alum and soap in the water and heat. Bring to a boil and add the wax with vigorous stirring. Waxes other than expensive beeswax will probably serve quite efficiently.

Lactic Acid Termed "Corrosive Poisoning"

The *Journal of American Medical Association* (125, 1179-81) has made the charge that excess lactic acid in modified milk formulas has been responsible for the death of three premature infants under violent and painful conditions. The charge is backed by experimental confirmation with test animals which died under similar circumstances with the same symptoms.

According to Drs. E. Gordon Young and Ralph P. Smith, lactic acid is a corrosive poison. In the three fatal human cases so far reported the effects of its use were acute hemorrhagic and gangrenous gastritis, and in those who lived longer, there was also acute enterocolitis and nephrosis. With test rabbits, the onset of death was produced quickly by the administration of ten grams of lactic acid in 30 cc. of milk mixture.

The reverberations of this report are likely to be felt throughout the food and beverage industries. With the scarcity of the commonly employed fruit acids has come a general acceptance of lactic acid for food preservation and food and beverage flavoring. The relative harmlessness of the acid has been assumed from its origin in milk products.

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Emulsion Cleaners

A highly efficient Base for the manufacture of emulsion type cleaners. Non-odorous, excellent anti-rusting properties, and good resistance to hard water precipitation. Used in conjunction with light mineral oil solvents. Makes high quality emulsion type cleaners.

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Xylol	Naphthalene
Phenol	Salt Coke
Cresol	Sulfate of Ammonia
Pyridines	Sulphuric Acid
Picolines	Sal Ammoniac

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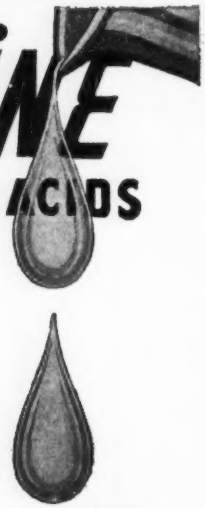

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CHEMICAL ECONOMICS & STATISTICS

Potash Deliveries

The five leading American potash producers delivered potash salts for agricultural purposes in thirty-nine states and the District of Columbia during the year June 1943 to May 1944, according to compilations released by the American Potash Institute. A total of 593,346 tons K_2O were delivered in the United States during this period; 39,698 tons went to Canada; 16,030 tons to Puerto Rico; 4,200 tons to Hawaii; and 1,595 tons to Cuba. Total agricultural deliveries amounted to 654,869 tons K_2O.

Georgia was the leading state for deliveries, taking 59,524 tons, and was followed in order by Virginia, Florida, Ohio, North Carolina, and Maryland, all taking more than 40,000 tons K_2O during the year.

The 60% muriate was by far the principal grade, with Georgia again the leading state, followed by Virginia, Ohio, Maryland, and Florida in order. Florida was the leading state for sulphate deliveries, followed by North Carolina and Virginia. The sulphate figures include both sulphate of potash and sulphate of potash magnesia. The 50% muriate grade, formerly the most popular, constituted less than 10% of the total. Manure salts, serving a war emergency role supplementing the refined salts, made up about another 10% of the total deliveries.

Canada took three-fourths of its potash in the form of 60% muriate, with the remaining one-fourth about equally divided among the other grades. Cuba, Puerto Rico, and Hawaii took only 60% muriate and sulphate.

Deliveries of Agricultural Potash Salts of American Origin June-May 1943-44
(In tons of 2,000 lbs. K_2O)

Point of Delivery	60% Muriate	50% Muriate	Manure Salts	Sulphates	Total
Alabama	17,541.14	2,143.00	4,076.40	42.77	23,803.31
Arkansas	4,218.25	778.00	2,534.61	11.00	7,541.86
California	3,491.00	.....	.....	5,883.29	9,374.29
Colorado	147.08	.....	.....	.....	147.08
Connecticut	3,526.62	93.50	.....	493.00	4,113.12
Delaware	3,371.43	70.00	21.00	117.80	3,580.23
District of Columbia	71.62	.....	.....	20.00	91.62
Florida	30,597.22	5,074.00	1,026.53	12.230.29	48.028.04
Georgia	39,386.72	6,675.50	9.998.01	3,463.82	59,524.05
Idaho	60.19	.....	35.00	.50	104.69
Illinois	26,774.96	1,407.00	6,834.38	357.17	35,373.51
Indiana	23,391.08	1,912.00	3,788.34	370.02	29,461.44
Iowa	565.26	60.00	.....	110.00	735.26
Kentucky	3,916.31	489.00	851.08	305.88	5,562.27
Louisiana	8,658.58	2,915.50	3,028.49	388.06	14,990.63
Maine	14,057.90	40.00	36.42	1,015.94	15,150.26
Maryland	34,485.09	3,775.00	703.05	1,720.77	40,683.91
Massachusetts	11,750.22	162.00	.....	607.06	12,519.28
Michigan	7,560.25	74.00	1,239.38	5.00	8,878.63
Minnesota	1,252.15	.....	123.38	.....	1,375.53
Mississippi	6,741.96	952.50	2,938.40	22.00	10.654.86
Missouri	24.00	.....	39.14	.....	63.14
New Jersey	24,346.68	2,039.00	93.68	357.12	26,836.48
New Mexico	.60	.....	.....	.....	.60
New York	9,868.82	185.00	676.90	24.37	10,755.09
North Carolina	26,785.11	5,519.50	3,177.23	8,893.40	44,375.24
North Dakota	132.76	.....	.....	.....	132.76
Ohio	37,421.52	2,486.00	5,108.96	596.25	45,612.73
Oregon	604.03	.....	.....	28.00	632.03
Pennsylvania	12,137.71	1,237.50	465.07	755.34	14,595.62
Rhode Island	165.23	.....	.....	.....	165.23
South Carolina	25,259.33	5,834.50	5,112.85	1,950.40	38,157.08
Tennessee	11,035.18	1,213.00	4,373.50	514.54	17,136.22
Texas	2,520.26	71.00	1,512.96	75.00	4,179.22
Utah	31.00	.....	.....	22.50	53.50
Vermont	337.12	.....	.....	8.80	345.92
Virginia	37,438.82	5,839.00	1,839.64	7,157.69	52,275.15
Washington	2,209.00	.....	.....	46.00	2,255.00
West Virginia	127.01	.....	37.72	.....	164.73
Wisconsin	1,994.68	399.00	392.48	230.36	3,016.52
TOTAL U. S.	434,012.89	51,444.50	60,064.60	47,824.14	593,346.13
Canada	30,940.09	2,487.00	3,643.28	2,627.93	39,698.30
Cuba	1,153.52	.....	.....	441.72	1,595.24
Puerto Rico	14,606.09	.....	.....	1,423.50	16,029.59
Hawaii	3,660.00	.....	.....	540.00	4,200.00
TOTAL Institute Terr.	484,372.59	53,931.50	63,707.88	52,857.29	654,869.26

Superphosphate

October statistics on superphosphate are based on the reports of 160 plants of which 157 manufacture normal superphosphate, nine manufacture concentrated superphosphate, and eight report production of wet-base goods. Three plants produce concentrated superphosphate exclusively, while 157 plants produce normal material only, or normal and concentrated or normal and wet-base goods. One plant, in South Carolina, which was formerly listed as producing concentrated superphosphate exclusively, is now reported in combination with the same company's normal superphosphate plant located in the same city. One new plant, located in Missouri, initiated normal superphosphate operations in October. The statistics include data for all plants, including government owned, known to have facilities for superphosphate production. All quantities are expressed in equivalent short tons, the figures for normal superphosphate being shown on a basis of 18 percent A.P.A. (available phosphoric acid), those for concentrated superphosphate on a basis of 45 percent A.P.A., and those for wet-base goods on a basis of 18 percent A.P.A. The statistics pertain only to superphosphate and include no data for dry-mixed or dry-base goods. Figures for receipts of material, shipments, consumption and stocks relate only to the plants actually producing superphosphate. Cases in which book figures differ from actual physical inventory are covered under the heading "Book Adjustments," the amount of book excess being indicated by a minus sign (—) and the amount of book deficit by a plus sign (+). Since all quantities of each type of superphosphate are accounted for in each month's report, the stocks on hand at the beginning of the month, plus receipt of materials, plus or minus book adjustments, minus shipments and consumption, equal stocks on hand at the end of the month.

These data were released by the Bureau of the Census, United States Department of Commerce.

Superphosphate: Production, Receipts, Disposition and Stocks, by Type, October 1944
Short tons (2000 pounds)

Item	October 1944 Normal 18% APA	October 1944 Concentrated 45% APA	October 1944 Wet Base Goods 18% APA	September 1944 Normal 18% APA	September 1944 Concentrated 45% APA	September 1944 Wet Base Goods 18% APA
Stocks on hand, beginning of month	783,274	31,808	7,465	764,180	36,536	5,716
Production	553,525	19,573	2,054	473,390	20,871	3,319
Received from other acidulators (including exchange transfers)	8,374	....	....	3,809	....	....
Book adjustments (account of inventory)	—409	+55	....	+1,619	....	+29
Total supply	1,344,764	51,436	9,519	1,242,998	57,407	9,064
Disposition, total	547,452	23,381	999	459,724	25,599	1,599
Shipments, total	317,249	23,262	651	261.602	25,539	1,353
Used in reporting plants	230,203	119	348	198,122	60	246
Stocks on hand, end of month	797,312	28,055	8,520	783,274	31,808	7,465

Coke Production Increases

The production of both byproduct and beehive coke in the United States as reported to the Bureau of Mines by coke-plant operators for the month of October, 1944, amounted to 6,160,611 net tons. This was an increase of 267,480 tons over the output in September; but was 15,289 tons below that in October, 1943, because of the continued decline in beehive oven operations. Stocks of coke at producers' plants increased 44,744 tons during October and on November 1 were equivalent to 5.7 days' production at the October rate. Stocks of coking coal at byproduct plants increased 223,088 tons during October and on November 1 were sufficient for 24.8 days' requirements at the rate of consumption prevailing in October. Coke was made at 87 byproduct plants 65 of which made ammonium sulfate; 23, ammonia liquor (4 plants recovered both sulfate and liquor); 33, naphthalene; 87, tar; and 8, creosote oil.

Fats and Oils

According to the report on animal and vegetable fats and oils released by J. C. Capt, Director of the Census, about 56 percent of total factory consumption, other than crude oils refined, was used in the production of soap and shortening, followed in order of importance by paint and varnish and oleomargarine. Primary oils winterized constituted six percent of the total.

Oils subjected to hydrogenation have been reported as used in the products for which they were intended. Considerable quantities of oils and fats shown as being used in refining and subjected to sulphonation also have been included in the totals shown for the various classes of products. For example, refined cottonseed oil reported as used in shortening was derived from crude oil previously reported as used in refining. Oils and fats shown as used in fat splitting do not include those oils and fats used for fat splitting for the production of soap during a later period. The data given pertaining to the factory consumption of animal and vegetable fats and oils do not include consumption in homes, hotels, bakeries, or by local contractors.

Fertilizer Volume Greater

Fertilizer tax tag sales in November were by far the largest ever reported for any November. Since actual fertilizer consumption in the month is negligible, the large sales reflect the advance buying of tags, which in turn is due to the anticipated early buying of fertilizer by farmers for use in the spring season. Tag sales in November and December to a very great extent represent fertilizer consumption in 1945, not in 1944.

November sales in the 17 reporting States totaled 589,000 tons, compared with 463,000 tons a year ago and 250,000 tons two years ago. Increases over last year were reported by 11 States and decreases by 6.

Sales in the first five months of the fiscal year, July through November, amounted to 1,694,000 tons this year against 1,565,000 tons last year.

The effect on sales statistics of November-December buying of tags for use on fertilizer moving in the following year is illustrated by the record for Indiana. Fertilizer shipments in the State in the January-October period were many thousands of tons greater this year than last, but there was a 44,000 tons decline in tag sales. Tags were bought in November and December 1943 for much of tonnage shipped in early 1944. A substan-

Table I.—Production of Coke Byproducts (a)

	October 1944[b]					
	Quantity	Change from last month	September 1944	October 1943	Calendar year to date 1944	Calendar year to date 1943
Ammonium sulfate..lbs.	138,948,173	+6.1%	130,968,777	130,407,000	1,357,145,933	1,268,835,000
Ammonia liquor (NH₃ content)..lbs.	5,431,500	+3.2	5,261,315	5,832,000	53,149,750	56,914,000
Naphthalene ....lbs.	8,127,569	−6.4	8,685,427	8,557,000	86,355,508	82,034,000
Tar .....gallons	64,366,220	+5.0	61,328,806	63,037,000	640,822,455	614,702,000
Creosote oil...gallons	3,870,158	−5.5	4,093,505	3,342,000	35,721,355	36,863,000

(a) Data reported to Bureau of Mines by byproduct coke plant operators only. Excludes production at gas plants other than byproduct coke plants, tar refineries, and synthetic chemical plants. Public distribution of data on benzol, toluol, xylol, and phenol has been suspended in accordance with Government war-time regulations. (b) Subject to revision.

Table II.—Sales and Value of Coke Byproducts (a)

	1944				1943	
	October[b]		September		October	
	Quantity	Value	Quantity	Value	Quantity	Value
Ammonium sulfate ...lbs.	142,885,273	$1,806,371	135,257,424	$1,718,951	116,801,045	$1,493,611
Ammonia liquor (NH₃ content).....lbs.	5,063,955	154,019	4,930,023	151,708	6,183,552	217,036
Naphthalene .....lbs.	8,547,336	176,146	8,384,777	168,389	8,931,361	175,987
Tar .....gallons	32,140,354	1,716,168	33,999,561	1,838,929	36,974,492	2,032,879
Creosote oil .....gallons	4,071,738	513,985	4,103,162	481,815	2,692,607	311,582

(a) Public distribution of data on benzol, toluol, xylol, and phenol has been suspended in accordance with Government war-time regulatons. (b) Subject to revision.

Table III.—Stocks of Coke Byproducts at End of Month (a)

	1944			1943		
	October[b]	September	Change from last month	October	September	Change from last month
Ammonium sulfate..lbs.	154,091,926	154,681,765	− 0.4%	89,913,621	76,383,741	+17.7%
Ammonia liquor (NH₃ content).....lbs.	1,356,469	1,273,241	+ 6.5	1,965,617	2,030,112	− 3.2
Naphthalene .....lbs.	2,550,640	2,972,277	−14.2	3,105,309	3,116,602	− 0.4
Tar .....gallons	32,783,174	30,260,233	+ 8.3	29,898,775	29,816,071	+ 0.3
Creosote oil .....gallons	703,236	973,050	−27.7	1,094,381	952,413	+14.9

(a) Public distribution of data on benzol, toluol, xylol, and phenol has been suspended in accordance ith Government war-time regulations. (b) Subject to revision.

Table IV.—Crude Light Oil and Its Derivatives Obtained from Coke-Oven Operations in the United States in 1943, in Gallons

		Sales			
			Value		
	Production	Quantity	Total	Average	On hand December 31
Crude light oil	[1]250,511,095	17,195,002	$1,541,698	$0.090	3,948,929
Benzol:					
All grades except motor.....	132,439,174	131,345,032	17,131,372	.130	3,864,744
Motor	21,267,932	21,387,487	1,925,569	.090	1,051,423
Toluol, crude and refined.....	32,272,593	31,823,080	8,566,565	.269	906,946
Xylol, crude and refined	8,763,927	8,634,391	2,148,911	.249	499,027
Solvents naphtha, crude, refined	5,232,848	4,878,296	719,669	.148	415,290
Other light oil products.....	8,955,610	6,555,340	652,370	.100	212,175
	[2]208,932,084	221,818,628	32,686,154	.147	.....

(1) Refined on premises to make the derived product shown: 245,893,002 gallons. (2) Total gallons of derived products.

Table V.—Comparison of Production and Sales of Crude Light Oil and Its Derivatives at Byproduct Coke Plants in the United States, Average 1936-1940, 1942, and 1943, in Gallons

	Average 1936-1940	1942	1943	Percent of change 1943-1942
Crude light oil:				
Production	173,405,005	246,024,882	250,511,095	+ 1.8%
Sales	10,148,774	14,915,409	17,195,002	+15.3
Value	$857,965	$1,247,073	$1,541,698	+23.6
Benzol:				
Production	106,860,102	150,054,593	153,707,106	+ 2.4
Sales	103,764,271	143,633,298	152,732,519	+ 6.3
Value	$10,294,203	$15,876,990	$19,056,941	+20.0
All grades except motor:				
Production	23,200,808	85,256,998	132,439,174	+55.3
Sales	22,840,927	80,778,763	131,345,032	+62.6
Value	$3,022,347	$10,487,450	$17,131,372	+63.4
Motor:				
Production	83,659,293	64,797,595	21,267,932	−67.2
Sales	80,923,344	62,854,535	21,387,487	−66.0
Value	$7,271,856	$5,389,540	$1,925,569	−64.3
Toluol:				
Production	19,979,759	32,314,560	32,272,593	− 0.1
Sales	19,831,529	32,182,327	31,823,080	− 1.1
Value	$4,766,051	$8,536,446	$8,566,565	+ 0.4
Xylol:				
Production	4,926,245	9,332,273	8,763,927	− 6.1
Sales	4,616,491	8,868,817	8,634,391	− 2.6
Value	$817,429	$2,219,991	$2,148,911	− 3.2
Solvent naphtha:				
Production	4,282,750	5,215,617	5,232,848	+ 0.3
Sales	4,182,703	5,067,935	4,878,296	− 3.7
Value	$1,046,652	$726,247	$719,669	− 0.9
Other light oil products:				
Production	6,800,392	9,238,117	8,955,610	− 3.1
Sales	4,393,516	7,509,421	6,555,340	−12.7
Value	$345,501	$686,533	$652,370	− 5.0

tial rise in tag sales took place in November 1944, which will be reflected in 1945 shipments.

Exports Decrease

Exports of merchandise from the United States during October 1944 were valued at $1,138,000,000, according to figures released by the Bureau of the Census, Department of Commerce. Merchandise valued at $890,000,000 and constituting 78 percent of this total was reported as exported under the Lend-Lease program. The value of merchandise shipped to United States armed forces abroad is not included in export statistics.

In releasing these figures, the Bureau of the Census pointed out that part of the decrease in the October export figure is due to delays in transmittals of Shippers' Export Declarations, from which the export statistics are compiled. The number of delayed declarations is normally very small but it is known that a number of shipments made at the end of October, which might have increased the total as much as 5 or 10 percent, were reported too late for inclusion in statistical reports for October. These delayed declarations will be included in the November export figure. The October export value figure is substantially lower than the September 1944 figure, and is also somewhat smaller than the value for October 1943.

General imports (arrivals) of merchandise into the United States during

Table VI.—Coke-Oven Crude Light Oil Produced in the United States and Derived Products Obtained and Sold in 1943, by States

State	Active plants	Produced (gallons) Total	Per ton of coal coked	Refined on premises (gallons)	Derived products obtained and sold Produced (gallons)	Sold[1] Gallons	Sold[1] Value	On hand Dec. 31 (gallons)
Alabama	8	20,088,217	2.74	19,001,294	16,254,319	15,618,576	$2,386,065	293,040
California	1	1,412,407	2.52	1,391,544	1,178,495	968,198	(2)	20,863
Colorado	1	3,270,218	3.10	3,265,827	3,010,447	2,910,360	(2)	21,600
Illinois	6	11,988,804	2.56	9,612,057	6,891,387	6,879,097	1,070,200	355,702
Indiana	5	24,403,348	2.19	26,958,700	24,024,629	23,718,511	3,571,280	287,526
Maryland	1	10,242,393	3.62	10,203,831	8,513,961	8,491,027	(2)	120,657
Michigan	4	11,818,720	2.94	6,659,635	5,964,774	5,878,465	811,809	232,665
New York	5	20,397,414	2.73	34,303,259	29,959,569	30,277,606	4,679,629	297,190
Ohio	15	39,570,043	2.77	34,186,272	27,478,008	27,036,970	4,069,298	612,237
Pennsylvania	13	74,806,988	3.10	74,653,903	63,914,259	63,400,221	9,537,694	1,129,988
Tennessee	1	857,532	2.40	859,899	772,440	782,993	(2)	5,253
Utah	1	1,587,446	4.07	1,588,163	1,138,897	1,149,023	(2)	9,200
West Va.	5	13,530,997	3.66	11,435,300	9,939,787	8,040,773	1,326,590	106,619
Conn., Ky., Mass., Minnesota, Mo., N. J., Wis.	9	16,536,568	2.47	11,773,318	9,891,112	9,471,806	1,603,674	456,389
Undistribut'd	..	.....	...	.....	.....	.....	2,088,217	.....
Grand total, 1943	78	250,511,095	2.83	245,893,002	208,932,084	204,623,626	31,144,456	3,948,929
At merchant plants	30	48,421,566	2.53	49,774,773	42,228,012	40,507,096	6,331,653	1,475,669
At furnace plants	48	202,089,529	2.91	196,118,229	166,704,072	164,116,530	24,812,803	2,473,260
Grand total, 1942	74	426,024,882	2.88	241,854,110	206,155,160	197,261,798	28,046,207	8,818,153

(1) Excludes 17,195,002 gallons of crude light oil valued at $1,541,698 sold as such. (2) Included under "Undistributed".

Table VII.—Production, Sales, Value, and Stocks of Benzol, Toluol, and Xylol, by Grades, by Months in 1943, in Gallons

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Production													
Benzol:													
Motor	2,115,833	2,129,226	2,061,156	1,797,915	1,623,749	1,595,140	1,610,882	1,596,134	1,745,835	1,702,343	1,661,092	1,628,627	21,267,932
1°	2,563,788	2,713,132	2,547,121	2,643,503	2,805,582	2,749,743	2,735,712	2,845,385	3,484,784	3,022,937	4,042,278	2,893,794	35,047,759
2°	7,946,030	6,917,902	8,348,188	7,985,836	8,108,838	7,241,056	6,856,295	7,487,659	7,470,331	8,329,974	7,235,796	9,318,694	93,246,599
90%	14,867	15,287	42,957	39,444	29,117	37,474	36,657	27,506	26,194	28,235	29,720	24,218	351,676
Other	390,943	277,038	311,092	288,605	316,750	291,168	266,820	304,440	302,327	317,774	325,094	401,089	3,793,140
Toluol:													
Nitration (1°)	2,154,039	2,034,128	2,312,158	2,224,284	2,263,691	2,205,599	2,205,306	2,359,592	2,352,393	2,353,417	2,294,375	2,393,386	27,152,368
Pure com'l (2°)	242,141	219,031	241,705	229,842	187,652	210,611	171,369	169,311	175,728	176,746	171,716	198,815	2,394,667
Other	234,053	222,055	238,237	241,056	223,443	226,084	277,063	277,540	246,036	198,078	170,997	170,916	2,725,558
Xylol:													
All grades	716,687	647,545	746,341	771,455	827,655	710,357	690,754	775,758	703,621	709,621	714,230	749,903	8,763,927
Sales													
Benzol:													
Motor	2,605,823	2,043,090	2,091,416	2,422,566	1,263,079	1,698,320	1,674,101	1,425,333	1,623,308	1,631,160	1,337,991	1,571,300	21,387,487
1°	2,385,897	2,540,985	2,615,313	2,345,101	2,691,857	2,843,107	2,785,183	2,444,179	3,096,187	2,690,828	3,650,611	2,716,419	32,805,667
2°	8,236,422	7,080,008	8,669,831	8,346,018	7,948,417	7,677,833	7,230,443	7,409,154	6,633,846	8,023,560	7,939,028	9,064,579	94,259,139
90%	24,625	40,237	48,450	42,836	20,104	37,815	36,242	21,407	29,672	15,658	34,464	23,427	374,937
Other	397,243	342,138	381,096	327,292	302,799	358,304	267,475	269,125	321,501	298,369	309,348	330,599	3,905,289
Toluol:													
Nitration (1°)	2,280,823	2,081,660	2,299,130	2,269,497	2,263,527	2,206,442	2,181,577	2,265,021	2,276,428	2,277,667	2,184,457	2,405,062	26,991,291
Pure com'l (2°)	248,317	176,312	244,620	256,861	150,472	184,461	160,868	160,128	139,133	162,512	171,115	179,582	2,234,381
Other	227,273	218,996	148,527	253,809	225,993	174,957	305,266	288,605	149,095	239,169	142,652	223,066	2,597,408
Xylol:													
All grades	789,240	674,642	738,380	737,388	762,762	623,105	731,338	630,820	760,125	636,975	129,555	820,061	8,634,391
Value													
Benzol:													
Motor	$232,164	$185,141	$185,341	$215,940	$111,194	$162,227	$150,126	$126,584	$146,221	$147,074	$120,774	$142,783	$1,925,569
1°	$316,484	$334,931	$347,231	$312,957	$358,761	$378,472	$376,976	$327,948	$411,664	$352,349	$480,956	$360,038	$4,358,767
2°	$1,069,378	$917,319	$1,124,643	$1,078,138	$1,023,467	$996,597	$940,775	$962,592	$864,641	$1,038,358	$1,028,446	$1,180,460	$12,224,814
90%	$3,754	$6,312	$7,055	$6,158	$3,070	$5,621	$5,421	$3,233	$4,321	82,387	$4,694	$3,610	$55,636
Other	$51,249	$43,595	$47,030	$40,904	$37,081	$44,327	$33,932	$34,380	$40,112	$37,302	$40,255	$41,988	$492,155
Toluol:													
Nitration (1°)	$638,414	$581,619	$637,053	$640,050	$620,682	$620,417	$613,912	$625,047	$636,893	$630,914	$605,167	$669,487	$7,534,655
Pure com'l (2°)	$67,970	$48,769	$66,245	$70,138	$41,656	$50,686	$44,474	$44,268	$38,235	$44,692	$46,997	$50,364	$614,494
Other	$38,534	$35,472	$24,652	$41,179	$36,082	$27,813	$49,930	$43,701	$23,451	$39,919	$22,547	$34,136	$417,416
Xylol:													
All grades	$197,721	$168,729	$180,078	$184,977	$188,250	$155,309	$185,090	$155,616	$194,168	$154,561	$177,604	$206,808	$2,148,911
Average Value Per Gallon													
Benzol:													
Motor	$0.089	$0.091	$0.089	$0.089	$0.088	$0.096	$0.090	$0.089	$0.090	$0.090	$0.090	$0.091	$0.090
1°	$0.133	$0.132	$0.133	$0.133	$0.133	$0.133	$0.135	$4.134	$0.133	$0.131	$0.132	$0.133	$0.133
2°	$0.130	$0.130	$0.130	$0.129	$0.129	$0.130	$0.130	$0.130	$0.130	$0.129	$0.130	$0.130	$0.130
90%	$0.152	$0.157	$0.146	$0.144	$0.153	$0.149	$0.159	$0.151	$0.146	$0.152	$0.136	$0.154	$0.148
Other	$0.129	$0.127	$0.123	$0.125	$0.122	$0.124	$0.127	$0.128	$0.125	$0.125	$0.130	$0.127	$0.126
Toluol:													
Nitration (1°)	$0.280	$0.279	$0.277	$0.282	$0.281	$0.281	$0.281	$0.276	$0.280	$0.277	$0.277	$0.278	$0.279
Pure com'l (2°)	$0.274	$0.277	$0.274	$0.273	$0.277	$0.275	$0.276	$0.276	$0.275	$0.275	$0.275	$0.280	$0.275
Other	$0.170	$0.162	$0.166	$0.162	$0.160	$0.159	$0.164	$0.151	$0.157	$0.167	$0.158	$0.153	$0.161
Xylol:													
All grades	$0.251	$0.250	$0.244	$0.251	$0.241	$0.249	$0.253	$0.247	$0.255	$0.243	$0.243	$0.252	$0.249
Stocks, End of Month													
Benzol:													
Motor	1,313,617	1,368,443	1,335,760	659,042	951,231	811,804	708,151	781,535	803,284	843,630	1,046,085	1,051,423	.....
1°	1,508,015	1,320,543	1,202,962	1,291,089	1,170,312	1,197,418	793,054	1,170,181	1,377,757	1,294,166	1,570,957	1,280,872	.....
2°	2,725,399	2,558,709	2,231,074	1,882,420	2,040,116	1,686,506	1,380,833	1,518,689	2,426,954	2,765,051	2,181,884	2,433,672	.....
90%	66,713	41,571	35,972	82,127	107,391	120,967	104,163	130,116	77,794	61,038	45,669	46,460	.....
Other	860,756	738,107	663,129	630,502	628,593	430,544	294,325	253,255	189,104	181,990	191,935	103,740	.....
Toluol:													
Nitration (1°)	587,122	529,554	532,636	470,948	458,407	448,628	455,235	532,569	600,243	659,941	752,165	719,758	.....
Pure com'l (2°)	137,958	167,739	147,756	111,181	123,742	133,743	135,126	118,752	138,556	134,497	126,267	124,317	.....
Other	112,079	92,775	161,952	128,051	117,088	159,582	115,465	91,201	181,262	118,643	131,720	62,871	.....
Xylol:													
All grades	506,258	427,997	422,988	431,716	443,726	521,328	450,317	593,241	530,504	618,035	604,891	499,027	.....

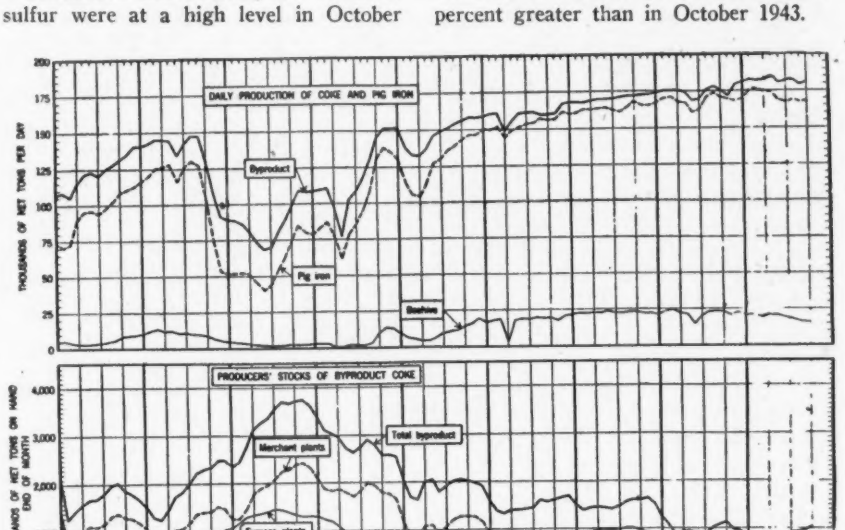
October 1944 were valued at $327,000,000. This amount is 17 percent greater than the September general import figure of $280,000,000.

Imports for consumption for October, valued at $330,000,000, exceeded general imports for the first time since January 1944. The October value was 18 percent greater than the $279,000,000 imports for consumption figure for the preceding month of September.

Importations of newsprint paper during October amounted to 210,300 tons, valued at $11,345,000. This represented a decrease of 8 percent in quantity and 9 percent in value as compared with September 1944 importations. Exports of newsprint paper decreased sharply in the month of October 1944 to a total of 1,600 short tons valued at $120,000, as compared with 3,300 short tons with a value of $253,000 exported in September 1944. These figures represent a decrease from September to October of 52 percent in both quantity and value.

Sulfur Production Up

Production and consumption of native sulfur were at a high level in October 1944, according to figures released by the Bureau of Mines, United States Department of the Interior. Production was 57 percent greater than in October 1943.



Factory Consumption of Primary Animal and Vegetable Fats and Oils, Third Quarter of 1944

(Quantities in thousands of pounds)

Kind of fat or oil	Grand total	Used in refining	Net total	Fat splitting	Pressing except winterizing	Subjected to sulphonation	Shortening	Oleomargarine	Whole oil used in winterizing	Other edible products	Soap	Paint and varnish	Linoleum and oilcloth	Printing inks	Lubricants and greases	Other misc. products
TOTAL		525,205	1,483,760	75,731	24,763	8,326	331,375	100,373	89,032	52,373	495,690	141,679	20,148	8,334	23,232	112,704
Vegetable Oils																
Cottonseed, crude.	123,727	123,485	242	....	....	....	....	....	....	....	53	1	....	....	70	118
Cottonseed, refined	234,587	....	234,587	....	....	183	110,383	44,294	59,826	19,141	122	1	....	....	75	562
Peanut, crude or virgin	24,835	24,750	85	....	....	1	....	....	....	....	71	....	....	1	....	12
Peanut, refined ..	24,073	....	24,073	....	....	636	13,877	4,703	471	3,608	24	....	....	....	....	754
Coconut, crude ..	47,935	18,528	29,407	9,104	....	7	....	....	....	....	19,430	....	....	....	1	865
Coconut, refined..	18,530	....	18,530	7,845	....	5	33	....	....	28	10,574	2	....	....	....	43
Corn, crude	48,583	48,136	447	....	....	23	....	....	....	....	97	6	....	....	1	320
Corn, refined	8,837	....	8,837	....	....	117	1,280	2,622	1,968	2,604	8	1	....	1	53	183
Soybean, crude ..	308,800	305,428	3,372	62	....	90	....	....	....	....	370	601	4	....	23	2,222
Soybean, refined..	261,788	....	261,788	....	....	139	165,301	43,443	19,893	23,909	234	3,769	34	7	52	5,007
Olive, edible	140	....	140	....	....	....	....	....	....	97	23	....	....	....	....	20
Olive, inedible ..	56	....	56	....	....	....	....	....	....	....	46	....	....	....	....	10
Olive, sulphur oil or olive foots ..	551	....	551	....	....	....	....	....	....	....	551	....	....	....	....	....
Palm kernel, crude	2	....	2	....	....	....	....	....	....	....	....	....	....	....	....	2
Palm kernel, ref'd	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Palm, crude	14,411	85	14,326	....	....	....	....	....	....	....	3,934	....	....	....	43	10,349
Palm, refined ...	94	....	94	....	....	....	....	....	....	....	86	....	....	....	....	8
Babassu, crude ..	1,813	1,151	662	....	....	....	....	....	....	....	662	....	....	....	....	....
Babassu, refined..	850	....	850	....	....	1	....	....	....	....	848	....	....	....	....	1
Rapeseed	4,288	....	4,288	....	....	....	....	....	....	....	....	....	....	....	3,313	975
Linseed	146,893	....	146,893	135	....	6	....	189	....	....	228	101,788	19,236	7,705	895	16,711
China wood or tung	2,606	....	2,606	....	....	....	....	....	....	....	....	2,080	....	6	....	520
Perilla	85	....	85	....	....	....	....	....	....	....	....	73	....	12	....	....
Castor No. 1, crude	39,284	....	30,284	238	....	916	....	....	....	....	2,698	3,457	14	245	153	31,563
Castor No. 3, crude	11,189	....	11,189	3,853	....	2,105	....	....	....	....	2,341	283	100	120	85	2,302
Castor, dehydrated	18,655	....	18,655	2	....	....	....	....	....	....	....	17,372	261	59	47	914
Castor,sulphonated	1,402	....	1,402	....	....	131	....	....	....	....	85	81	....	3	141	961
Sesame	327	158	169	....	....	....	....	....	18	....	....	....	....	....	....	151
Oiticica	3,124	....	3,124	3	....	....	....	....	....	....	....	2,530	....	75	....	516
Other vegetable..	11,646	1,006	10,640	....	....	171	876	353	6,856	1,215	162	100	....	1	....	906
Animal Fats																
Lard, rendered (including lard and rendered pork fat)	66,660	....	66,660	302	2,288	....	15,663	1,883	....	587	45,827	....	....	2	92	16
Stearin, animal, edible	7,624	....	7,624	....	....	....	6,281	694	....	553	12	....	....	....	....	84
Oleo oil	3,039	....	3,039	....	....	....	229	2,192	....	6	599	....	....	....	5	8
Tallow, edible ..	33,014	....	33,014	....	....	58	16,879	....	....	625	15,086	....	....	....	171	195
Tallow, inedible .	296,606	15	296,591	33,438	1,914	1,097	....	....	....	....	248,501	2	....	5	8,169	3,465
Neat's-foot oil ..	990	....	990	....	2	77	....	....	....	....	....	....	....	2	46	863
Fish and Marine Mammal Oils																
Cod oil	2,530	....	2,530	....	....	384	....	....	....	....	....	....	....	....	12	2,134
Cod-liver oil	2,133	....	2,133	....	....	....	....	....	....	....	....	....	....	....	....	2,133
Other liver oil..	2,390	47	2,343	....	....	34	....	....	....	....	....	2	....	....	....	2,307
Marine mammal oils	4,055	....	4,055	....	....	635	....	....	....	....	6	....	....	1	1,869	1,544
Fish oil	41,160	....	41,160	2,513	....	1,442	573	....	....	....	4,811	9,525	499	28	443	21,326
Greases																
Greases, other than wool	184,495	58	184,437	18,236	20,559	68	....	....	....	....	138,127	3	....	40	6,125	1,279
Wool greases ...	5,158	2,358	2,800	....	....	....	....	....	....	....	74	2	....	21	1,348	1,355

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WAR REGULATIONS SUMMARY

ACRYLONITRILE—Removed from allocation by revocation of Schedule 66, Order M-300. The supply of acrylonitrile is now in excess of requirements.

ALKYL AMINES—An amendment to Schedule 27 of Order M-300 has changed the allocation period for these materials from a quarterly to a monthly basis. WPB states that the increased military requirements for alkyl amines have made it impractical to allocate the available supply more than one month in advance. Under the amendment, the small-order exemption is changed from 1,000 lbs. a quarter of the 30 per cent solution to 375 lbs.—or one standard size drum—per month.

AMMONIA (by-product) and AMMONIUM SULFATE—Placed under control of Schedule 80, Order M-300. Previous Order M-163 revoked.

AMMONIA (synthetic) — Placed under control of Schedule 79, Order M-300. Previous Order M-164 revoked.

ASCORBIC ACID—Removed from allocation by revocation of Schedule 56, Order M-300.

ATABRINE—Order M-306 revoked, discontinuing allocation.

DYESTUFFS—Class B dyestuffs allotments may now be filled by Class A dyestuffs up to 25 per cent of the total allotment, through amendment to Conservation Order M-103. The amended order also increases the quota of Class B dyestuffs from 15 per cent to 20 per cent per quarter of the combined amount of Class A and Class B dyestuffs delivered in 1941, plus 250 lbs. It also increases allowable exports of Class B dyestuffs to all places other than Canada from the previous 1 per cent to 2 per cent of all Class B dyestuffs delivered in 1941.

ETHYL ACETATE and ISOPROPYL ACETATE—Control of these chemicals placed under Order M-300, Schedule 76. Order M-327 revoked. Small-order exemption changed from aggregate of 2,000 lbs. of both chemicals per month to 1,200 lbs. a month for ethyl acetate and 780 lbs. a month for isopropyl acetate.

LINSEED REPLACEMENT OIL—Sale is permitted of linseed replacement oil in 55 gallon drums on a drum included basis, with extra charge for drum. Amend. 196. Rev. Sup. Reg. 14, Gen. Max. Price Reg.

SODIUM NITRATE—Placed under control of Schedule 80, Order M-300. Previous Order M-62 revoked.

UREA—Small order exemption for urea and melamine aldehyde resins for protective coatings reduced from 2,000 to 550 lbs. per month effective January 1. Amendment to Schedule 34, Order M-300.

VINYL ACETATE—Removed from allocation by revocation of Order M-240. Supply is now in excess of requirements.

Tolley Designated Food Commission Representative

Howard H. Tolley, chief of the Bureau of Agricultural Economics of the Department of Agriculture, has been designated as American representative of the United Nations Interim Food Commission by President Roosevelt. Mr. Tolley replaces Paul H. Appleby, who recently resigned.

Mr. Roosevelt also appointed Leroy D. Stinebower of the State Department as American alternate on the Commission.

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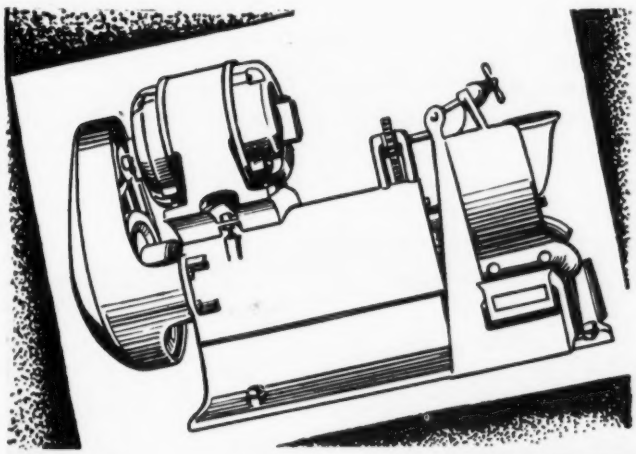

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CANADIAN NEWS

by *W. A. JORDAN*

Chemical Institute States Aims

THE Chemical Institute of Canada, created recently by the amalgamation of the Canadian Institute of Chemistry, Canadian Chemical Association, and Society of Chemical Industry (Canada) officially came into being on January 1 to provide the Dominion with a single national organization to represent chemical engineers, chemists, and those interested in chemical affairs. The three component societies cease to exist, although the Society of Chemical Industry (Canada) will hold occasional, non-conflicting special meetings of its members to deal with business matters of the international society.

The avowed objects of the Institute, as representative of chemical men, are, fundamentally: promotion of chemical knowledge; provision of facilities for the collaboration of scientists; establishment of high educational standards among chemists and chemical engineers; promotion of the social and economic well-being of its members; and to offer a means of cooperation with other scientific bodies throughout the world.

The Institute intends to urge upon government that it be represented on committees dealing with matters within its competence, particularly as to the furthering of sound scientific planning, and legislative matters pertaining to taxation which relates to research. Hitherto the multiplicity of small societies precluded the possibility of effectively voicing such sentiments in Ottawa.

In the labor relations field, the Institute has gone on record as being unalterably opposed to the forced inclusion of professional chemists in heterogeneous bargaining units dominated by non-professionals, and maintains that matters of professional interest should be dealt with by professionals. Too, recognizing the right of all citizens to bargain individually with their employers according to their worth and merit, but in order that its members may bargain more favorably, the Institute intends to urge upon all employers acceptance of a scale of minimum starting salaries. It recommends that members do not accept employment with employers who do not subscribe to this scale of salaries, and will refuse the use of its own employment agencies to such employers, thus following closely a policy already in effect in the American Chemical Society.

At present the Institute is campaigning rather vigorously for the continuance of the activities of the Wartime Bureau of Technical Personnel after the war. This Bureau, created as a wartime placement agency for technical personnel and financed by the government but directed by an advisory board of representatives from technical societies, has functioned for the past few years to channel technical personnel into essential occupations.

It is hoped that this Bureau for the national registration and placement of technical personnel may be maintained in the postwar period, in modified form, to complement the government's general employment offices.

New Aluminum Sulfate Unit

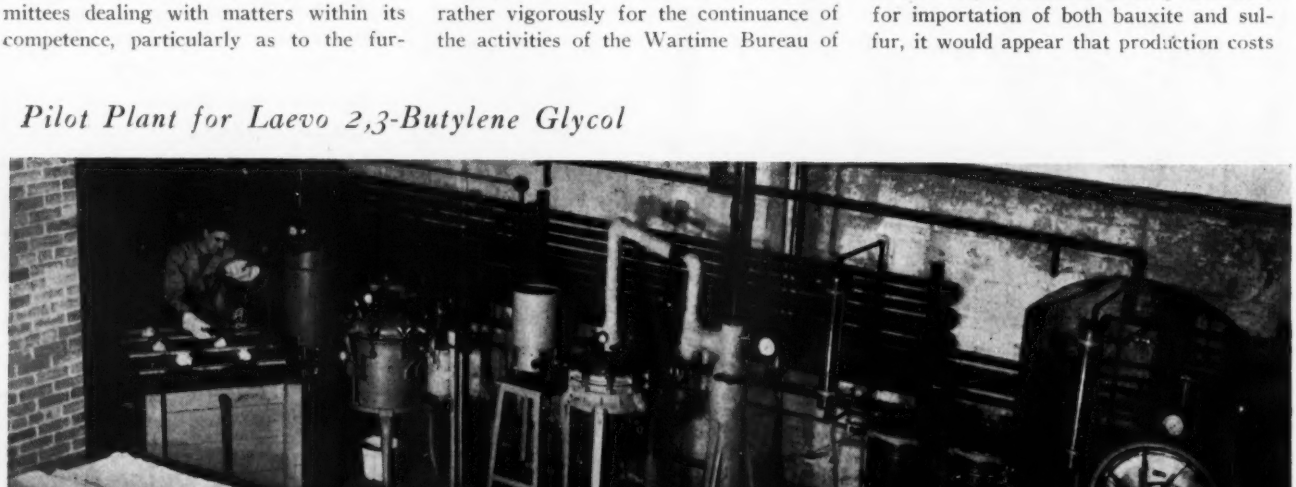
The Aluminum Co. of Canada, Ltd., has begun construction of a plant at Arvida, Quebec, adjacent to its huge aluminum producing facilities, for the manufacture of aluminum sulfate. It is anticipated that the new unit will be in full scale operation by early spring.

Currently, aluminum sulfate ranks as one of the Dominion's major chemical imports, with some 37,660 tons valued at $976,470 shipped into Canada in 1943. Ninety per cent of this total was supplied by U.S.A. producers and the remainder by Great Britain.

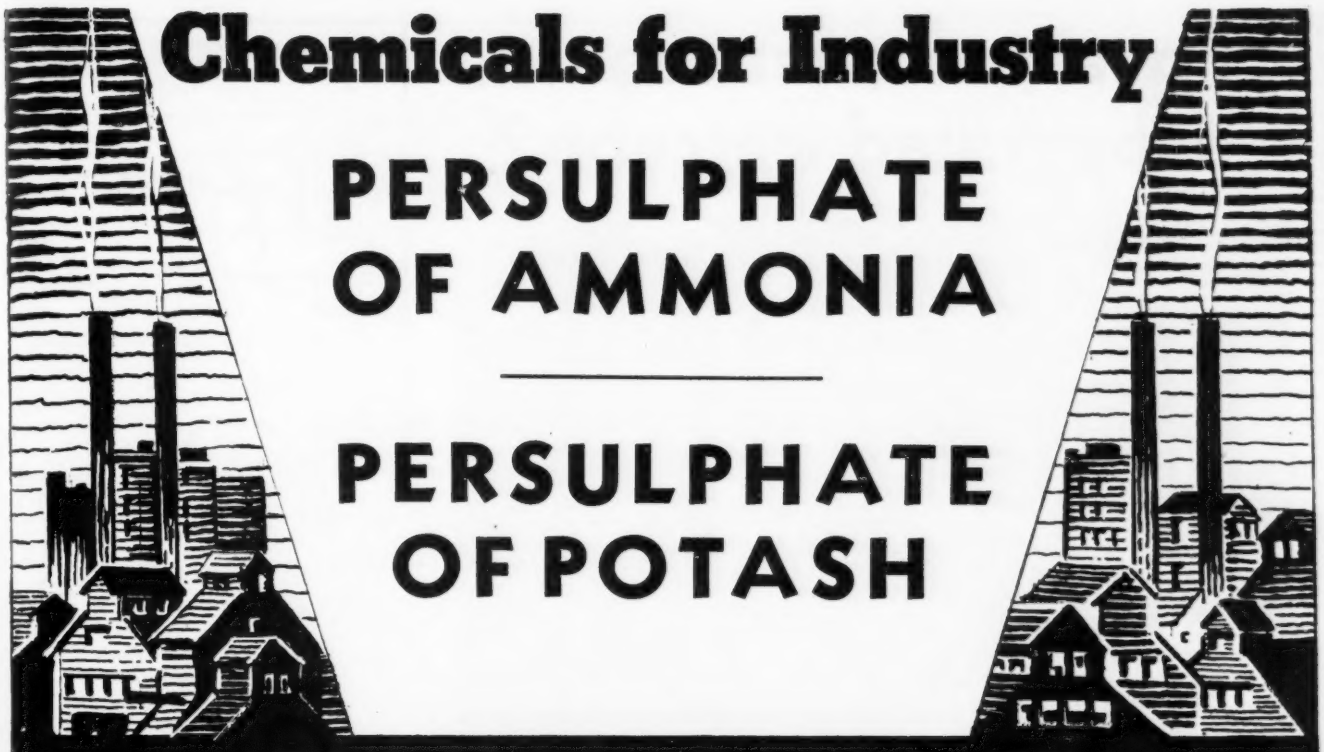
Although it is stated that the Aluminum Co. project will be designed primarily to accommodate Canadian demand for the sulfate, it is admitted that export possibilities will also be considered in the future.

In that Aluminum Co. has manufactured its own sulfuric for several years—from Texas sulfur—the plant will be essentially self-contained. Too, located as it is, with ocean freight facilities readily available for importation of both bauxite and sulfur, it would appear that production costs

Pilot Plant for Laevo 2,3-Butylene Glycol



Developmental work on production of laevo 2,3-butylene glycol is being carried out in this pilot plant set-up in the fermentation laboratories of the Division of Applied Biology of the National Research Council at Ottawa. The laevo form, plus a substantial amount of ethanol, is produced by Aerobacillus fermentation, whereas the recent intensive investigations in the United States have been with Aerobacter fermentation, which produces a mixture of the dextro and meso forms plus a small amount of ethanol.



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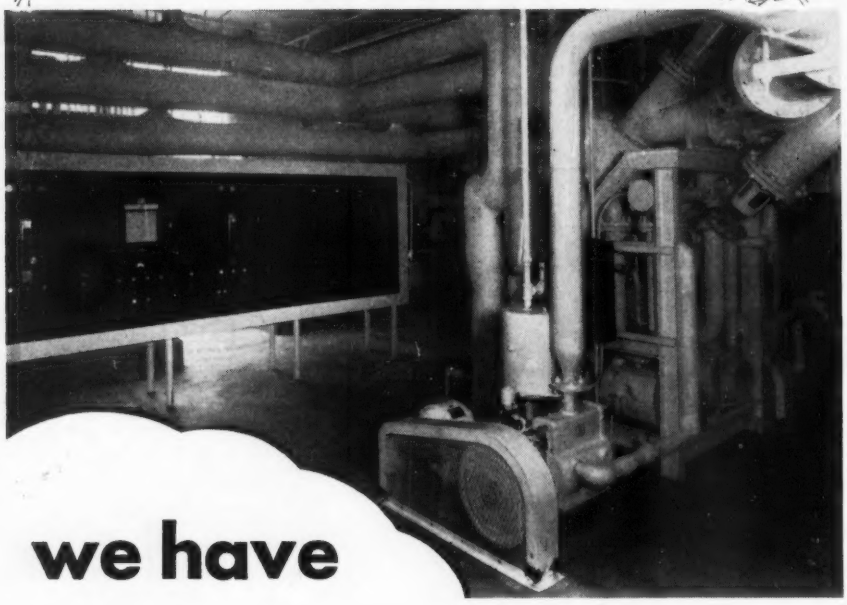

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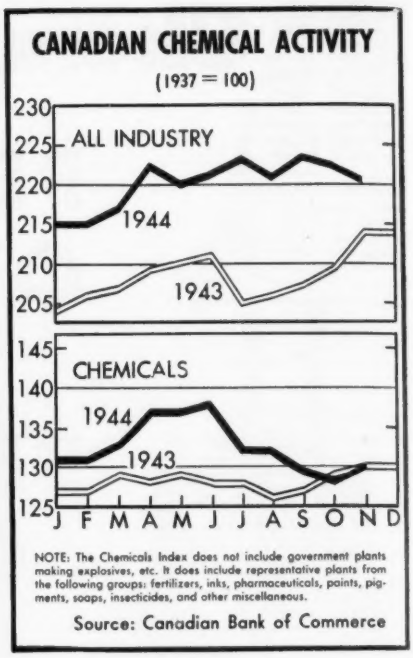

of the sulfate, normally, should be basically favorable.

Naugatuck Making Quinoline

Naugatuck Chemicals Ltd., Canadian subsidiary of the United States Rubber Co., has recently brought into production a small unit for the manufacture of quinoline from aniline. A novel process, developed by Naugatuck, is being employed, with total output of the pilot plant amounting to some 10,000 pounds of quinoline to date.

Hitherto, no quinoline, either from coal tar or aniline has been made in Canada, and the domestic market has been supplied by the U.S.A.

The aniline-based quinoline is produced in the form of water-white crystals, and is said to be of exceptional purity—98 per cent plus—and therefore is particularly suitable as an organic intermediate in, for instance, the pharmaceutical field.

Acetate Plans

Canadian Industries, Ltd., announced recently that it has been conducting a detailed survey of the Canadian market for cellulose acetate yarn, and the erection of a plant for the production of this material is being considered as one of the company's postwar projects. No definite decision has been made known in this connection as yet, but substantial expansion of C.I.L.'s nylon producing facilities is officially assured.

Almost coincidentally, Canadian Celanese, Ltd., reported that it has decided that the major portion of its new plant extension at Drummondville, Quebec, will be devoted to the manufacture of cellulose acetate staple and filament yarns, for sale to Canadian mills. The unit, which is now under construction, is designed to produce seven to eight million pounds per

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Viscosity (GH)	T-V	Y-Z_1	W-Y	Z_1-Z_3
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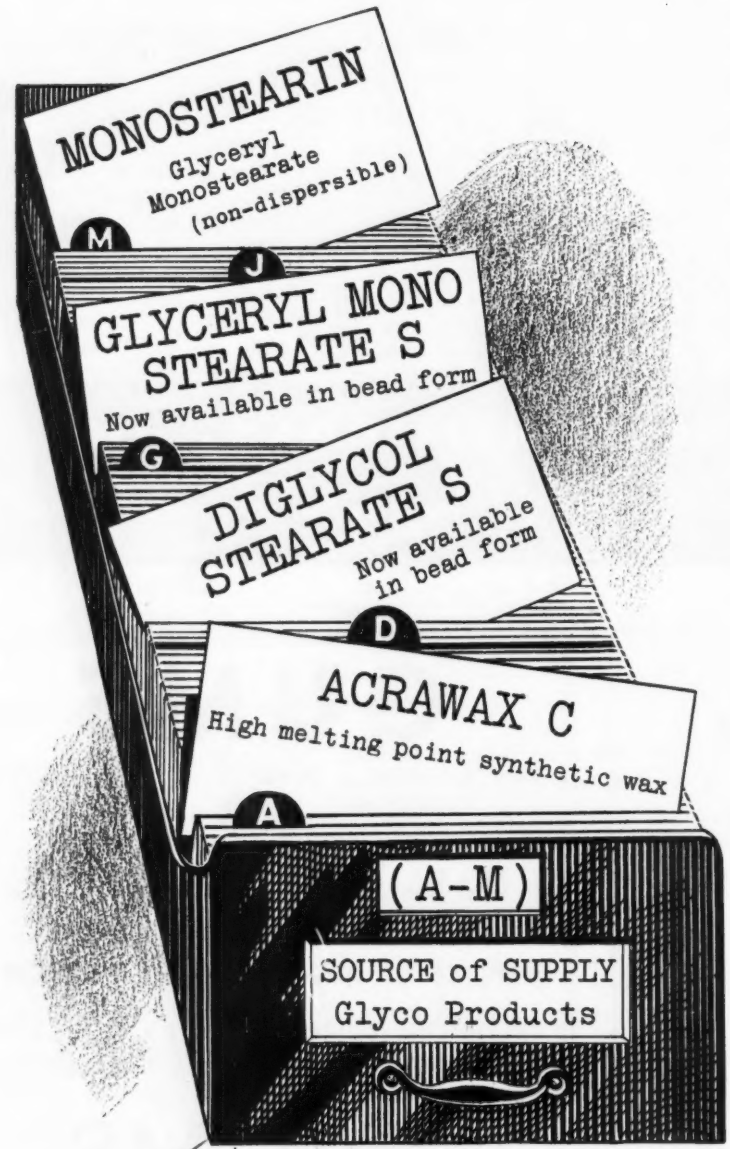

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annum of cellulose acetate, in addition to present output, which, incidentally, has been mainly marketed in the form of fabrics woven by Celanese. It is stated, currently, however, that the new production will be sold in the main to Canadian hosiery and weaving mills.

Lilly Buys Toronto Site

Eli Lilly & Co. (Canada), Ltd., Canadian subsidiary of Eli Lilly & Co., Inc., Indianapolis, which has acted as distributors of the Lilly pharmaceutical and biological products in Canada since 1939, has purchased a site near Toronto and plans the erection of a factory for the manufacture and packaging of some of their products in Canada.

It is reported that a fair sized building will be erected and that employment will be given to some 100 hands. H. J. Jensen, manager of the Canadian subsidiary, states however, that details of the project are still under discussion and complete plans will not be finalized until late next month.

Murphy Paint Expands

Murphy Paint Co., Ltd., recently acquired Canadian affiliate of Pittsburgh Plate Glass Co., is completing plans for the construction of a paint factory at Long Branch (Toronto), Ontario.

Murphy has two plants in Canada at the present time, one in Montreal and one in Windsor. The third unit is being established to supply more conveniently the needs of the Ontario market.

Goodrich to Spend Million

The B. F. Goodrich Rubber Co. of Canada, Ltd., Kitchener, Ont., is beginning immediate expansion of its present plant and production facilities involving an expenditure of more than $1,000,000, according to President George W. Sawin.

The program includes the construction of a three-story addition to its present plant and the installation of new equipment, mainly for the manufacture of tires and tubes.

Gelatin Products to Toronto

Gelatin Products, Ltd., major Canadian manufacturer of gelatin capsules and capsulated products, and affiliate of Gelatin Products Corp., Detroit, has purchased a ten-acre Toronto site and will erect a one-story, 30,000 square-feet factory building next spring.

Upon completion of the planned facilities, Gelatin Products will transfer its operations from Windsor, where it originally located several years ago, to Toronto.

C. H. Madsen has succeeded E. R. Rowzee as manager of the Canadian Synthetic Rubber Co. Mr. Madsen is a graduate in chemical engineering from the University of British Columbia.

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MARKETS IN REVIEW

Military Needs Cause New Dislocations

Glycerin in Demand

Shortage of Phosphate Affects Soapmakers

Shortage of Mercury Reflected in Price Rise

Sodium Metal Critical

Various Classifications Reviewed

MILITARY REVERSALS in the European theater have necessitated a new evaluation of chemical needs. The following developments can be expected:

An increase in ammonia-producing facilities is foreseen in order to meet explosives demands.

This will be accompanied by a tightening of synthetic nitrogen for fertilizers and a reduced amount of fertliizer for the current crop year.

A reduction in the amount of methanol production will shorten formaldehyde supplies for plastics.

The increased demand for TNT will further tighten toluene allocations.

A shortage of acetic anhydride will curtail acetate rayon production.

Whether the necessary increase in ammonia production will be met by new construction or by more intensive use of existing facilities is not known. In any case, more of the ammonia will be channeled into explosives manufacture, cutting down the proportion available for fertilizers. Even so, there will be more fertilizer available than in 1941-42 or any previous peacetime year. There will be less, however, than in the two preceding crop years, and the shipping situation is such that the importation of Chilean nitrate cannot be increased.

Another fly in the ointment for fertilizer users was the breakdown of the Rubber Reserve Company's facilities for the conversion of potassium chloride to potassium sulfate. This program was initiated in November to supplement the supply of potassium sulfate, particularly in tobacco-producing areas. The possibility of resuming production is being investigated, the WPB said, but a delay of several weeks is anticipated.

A revised estimate of potash production, 860,000 tons in 1944-45, was approximately 15,000 tons less than the previous estimate. The total supply for agriculture is about 712,000 tons. An earlier estimate had indicated that the 725,000-ton requirement presented by the WFA would be met. In accordance with these findings, it was decided that allocation of potash to fertilizer manufacturers be continued until supplies are sufficient to meet all essential requirements.

The indicated shortage of methanol will, as was mentioned above, limit the amount of formaldehyde available for plastics. Since methanol is also used as an anti-freeze, production of this commodity will suffer in the 1945-46 season.

Repercussions of the toluene and acetic anhydride shortages will be felt in the pharmaceutical and dye industries. It is unlikely that either of these will be available for any except the most essential requirements.

Although glycerin production is at a high level, stocks have fallen recently on account of increased demands. Seven hundred tons have been ordered by Lend-Lease—most of it, apparently, for Europe. Vast quantities will be required there for the dynamiting of wrecked buildings. More will be required, it is expected, in the domestic market for the manufacture of alkyd resins, pharmaceuticals, and proprietaries; and although a six-months' supply is on hand, the market is expected to become firmer.

Soap manufacturers will suffer from a shortage of tetrasodium pyrophosphate, an essential ingredient in the granulated soaps which constitute three-fourths of soap production. The scarcity of this chemical is due to a shortage of phosphorus. Military demands for phosphorus will be heavier in 1945, and essential civilian needs cannot be met in full with present production. A project is now under consideration for a new phosphorus furnace at the Wilson Dam, Alabama, plant operated by the TVA. This will produce an additional 9,000 tons a year.

As was predicted last month, the price of mercurials increased, reflecting the diminishing supply of mercury. Various derivatives, such as calomel, corrosive sublimate, red and white precipitates, and red and yellow oxides, as well as the metal itself, showed substantial price rises. Some easing of the situation may result from current conversations with Spain concerning 3,000 flasks of the metal, but negotiations are still in a preliminary stage. A considerable stockpile is held by the Metals Reserve Corporation, and unless other sources of supply are forthcoming, some of it will have to be allocated to essential uses.

Sodium is another metal which has received attention on account of the critical situation surrounding it. WPB spokesmen pointed out that this material is used in the manufacture of tetraethyl lead for aviation gasoline. Stainless steel manufacturers, who use it for descaling steel, were warned to conserve it in order to assure adequate supplies. Use of sodium metal has been frozen at the previous six-months' level.

Heavy Chemicals—The very tight position in potassium carbonate and hydroxide has been rendered more so by frantic buying on the part of some consumers. The major producers consider it unwise to expand production facilities further, and they have chosen instead to investigate their orders more carefully, releasing material only for the more essential requirements. The heavy demand for caustic soda continued, reducing stocks to the lowest level of the year.

Refined sulfur moved in large volume to the chemical, meat-packing, and pharmaceutical industries. Copper sulfate stocks fell to the lowest of the year because of Government withdrawals for UNRRA. Production over the first quarter of 1945, however, is expected to meet agricultural demands.

Heightened military requirements caused large movements of the inorganic acids—hydrofluoric and sulfuric, and the organic acids—lactic, oxalic, naphthenic, and sulfonic—were also in large demand. Shortages in antimony oxide, copper oxide, chlorine, and other industrial chemicals were traceable to heavier Government needs. The sulfuric acid situation was further complicated by the scarcity of tank cars.

Fine Chemicals—Menthol continued to drop in price as stocks accumulated in this country from South American imports. Notwithstanding the lower price levels, trading was very slow. The industrial alcohol supply is expected to ease in 1945. Current estimates of supply and demand are 594 and 548 millions of gallons respectively.

Increased buying of sulfa drugs by the armed forces has maintained the output at a steadily increasing rate. Saccharine, lanoline, and hydrogen peroxide continue to be in demand; inquiries for the latter have failed to uncover any sizable quantities. About a quarter of the citric acid production is going to the armed forces, and it does not appear likely that any more will be available to drug or other manufacturing consumers. Practically none is being made from citrus fruits, and the other available raw material,

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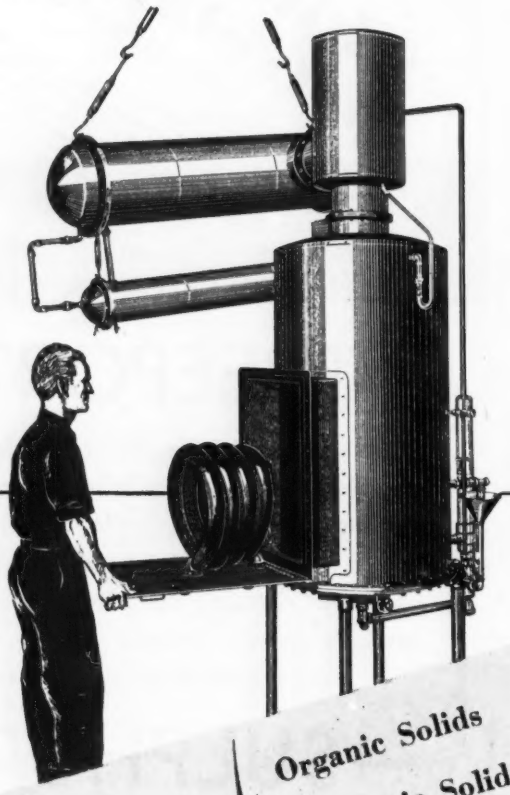

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sugar, is in critical supply. The latter situation may improve as a result of current negotiations with Cuba for the 1945 and 1946 crops. At last report, there was only a small difference between prices bid and asked.

Coal Tar Chemicals—Benzene was the only aromatic hydrocarbon in anything like adequate supply the first part of last month, but the recent military situation has drawn more heavily on all, including benzene. Naphthalene, toluene, and xylene, as well as phthalic anhydride, continued to be short as they have been for some time.

Phenol, cresylic acid, cresol, tar acid oils, and aniline remained moderately tight. Their inventories were expected to be lower than at any previous time of the year.

Predictions of shortages in hydrogenated solvents failed to materialize. Moderate quantities were available.

Paint Materials—The most important news for paint manufacturers was WPB's cut of lead allotments to 60 per cent of the 1944 level. This 40 per cent cut does not necessarily mean a proportional cut in the production of civilian paints, however, for the substitution of titanium pigments will alleviate the lead shortage. It is predicted that civilian paint production can be kept to a maximum reduction of 10 per cent. Both manufacturers' and dealers' inventories are down, so it appears likely that consumers will have to get along with less paint.

Not only has the lead supply been reduced, but the oil quota has been cut from 70 to 60 per cent. At the time of the first cut, two years ago, the formulas were changed to embody less oil, and it is generally conceded that no further reductions are possible.

Zinc pigments are in little better position. Although the output of zinc slabs has been increased, military and civilian requirements continue to outrun production, and the stockpile is gradually dwindling.

Producers of zinc oxide believe that the lead order will reduce the use of leaded zinc oxide. Since this is the only type of zinc oxide permitted for civilian paint, such a tendency would have a direct bearing on available supplies. The order will have no effect, however, on lead-free oxide.

The increased demand for carbon black for the manufacture of military vehicle tires has put that material in an extremely tight situation. All types with the exception of uncompressed blacks have been under allocation for some time.

Processors of shellac have been unable to obtain sufficient quantities of their prime raw material. The Defense Supply Corporation's stockpile is being used to supply the demand.

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VINYL ACETATE, MONOMERIC

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On January 1st Monomeric Vinyl Acetate was taken off allocation.

Now is the time to complete experimental work so as to be ready to take advantage of post-war demands. Large amounts of Vinyl Acetate will be used for the manufacture of polyvinyl alcohols, polyvinyl acetates, polyvinyl acetals, copolymers and synthetics for a large variety of civilian uses.

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Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f.o.b. works are specified as such. Import chemicals are so designated.

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both.

Purchasing Power of the Dollar: 1926 Average—$1.00
Dec., '42, $0.980 Dec., '43, $0.910 Dec., '44, $0.890

	Current Market	1944 Low	1944 High	1943 Low	1943 High
Acetaldehyde,99%,drs.wks. lb.	.11	.11	.14	.11	.14
Acetic Anhydride, drs, ...lb.	.11½	.11½	.13	.11½	.13
Acetone, tks, delv .....lb.	...	...	.07	...	.07
ACIDS					
Acetic, 28%, bbls ....100 lbs.	3.38	3.38	3.63	3.38	3.63
glacial, bbls. .....100 lbs.	9.15	9.40	9.15	9.40	9.15
tks, wks. .....100 lbs.	6.93	7.25	6.93	7.25	...
Acetylsalicylic, Standard USP .....lb.	.40	.54	.40	.54	.40
Benzoic, tech, bbls. .....lb.	.43	.47	.39	.47	.39
USP, bbls, 4,000 lbs. up lb.	...	.54	...	.54	...
Boric, tech, bbls, c-l,....ton *a*	...	109.00	...	109.00	...
Chlorosulfonic, drs, wks. ..lb.	.03	.04½	.03	.04½	.03
Citric, crys, gran, bbls, lb. *b*	.20	.21	.20	.21	.20
Cresylic 50%, 210-215° HB, drs, wks, frt equal gal.	.81	.83	.81	.83	.81
Formic, Dom. cbys .....lb.	.10½	.11½	.10½	.11½	.10½
Hydrofluoric, 30% rubber, dms. .....lb.	.08	.09	.08	.09	.08
Lactic, 22%, lgt, bbls wks lb.	.039	.0415	.039	.0415	.039
44%, light, bbls wks ...lb.	.073	.0755	.073	.0755	.073
Maleic, Anhydride, drs....lb.	.25	.26	.25	.26	.25
Muriatic, 18° cbys ...100 lb.	1.50	1.75	1.50	1.75	1.50
20° cbys, c-l, wks ..100 lb.	...	1.75	...	1.75	...
22° cbys, c-l, wks ..100 lb.	...	2.25	...	2.25	...
Nitric,36°, cbys, wks 100 lbs. *c*	5.00	5.25	5.00	5.25	5.00
38°, c-l, cbys, wks 100 lbs. *c*	...	5.50	...	5.50	...
40°, c-l, cbys, wks 100 lbs. *c*	...	6.00	...	6.00	...
42°, c-l, cbys, wks 100 lbs. *c*	...	6.50	...	6.50	...
Oxalic, bbls, wks .....lb.	.11¼	.12½	.11¼	.12½	.11¼
Phosphoric, 100 lb. cbys, USP .....lb.	.10½	.13	.10½	.13	.10½
Salicylic, tech, bbls .....lb.	.26	.42	.26	.42	.26
Sulfuric, 60°, tks, wks ..ton	...	13.00	...	13.00	...
66°, tks, wks .....ton	...	16.50	...	16.50	...
Fuming (Oleum) 20% tks. wks .....ton	...	19.50	...	19.50	...
Tartaric, USP, bbls .....lb.	...	.70½	...	.70½	...
Alcohol, Amyl (from Pentane) tks, delv .....lb.	...	.131	...	.131	...
Butyl, normal, syn, tks..lb.	...	.10¾	...	.10¾	.10¾
Denatured, CD 14, c-l drs, ...gal. *d*	...	.57	...	.57	...
Denatured, SD, No.1, tks. *d*	...	.50	...	.50	...
Ethyl, 190 proof tks...gal.	...	17.60	...	17.60	...
Isobutyl, ref'd, drs ....lb.	...	.086	...	.086	...
Isopropyl ref'd, 91%, dms .....gal.	.39	.66½	.39	.66½	.39
Propyl, nor, drs, wks gal.	.67	.76	.67	.76	.67
Alum, ammonia, lump, bbls, wks .....100 lb.	...	4.25	...	4.25	...
Aluminum, 98-99% ..100 lb.	15.00	16.00	15.00	16.00	15.00
Chloride anhyd bbls wks lb.	.09	.12	.08	.12	.08
Hydrate, light .....lb.	.14½	.15	.14½	.15	.14½
Sulfate, com'l. bgs, wks, c-l .....100 lb.	1.15	1.25	1.15	1.25	1.15
Sulfate, iron-free, bgs. wks .....100 lb.	1.85	2.10	1.85	2.50	1.75
Ammonia anhyd, cyl .....lb.	...	.14½	...	.14½	...
Ammonium Carbonate, lumps, dms .....lb.	.08½	.09¼	.08½	.09¼	.08¼
Chloride,whi,bbls,wks,100 lb.	4.45	5.15	4.45	5.15	4.45
Nitrate, tech. bags, wks..lb.	.0435	.0850	.0435	.0850	.0435
Oxalate pure, grn. bbls..lb.	.27	.33	.27	.33	.27
Perchlorate, kgs .....lb.	.55	.65	.55	.65	.55
Phosphate, dibasic tech, bbls .....lb.	.07¼	.08½	.07¼	.08½	.07¼
Stearate, anhyd, dms ...lb.	...	.34	...	.34	...
Sulfate, dms, bulk.....ton	28.20	29.20	28.20	29.20	28.20
Amyl Acetate (from pentane) c-l, drs, delv .....lb.	...	.15½	...	.18½	...
Aniline Oil, drs .....lb.	.11½	.12½	.11½	.12½	.11½
Anthraquinone, sub, bbls..lb.	...	.70	...	.70	...
Antimony Oxide, bgs .....lb.	.15	.15½	.15	.15½	.15
Arsenic, whi, kgs—powd..lb.	.04	.04¾	.04	.04¾	.04

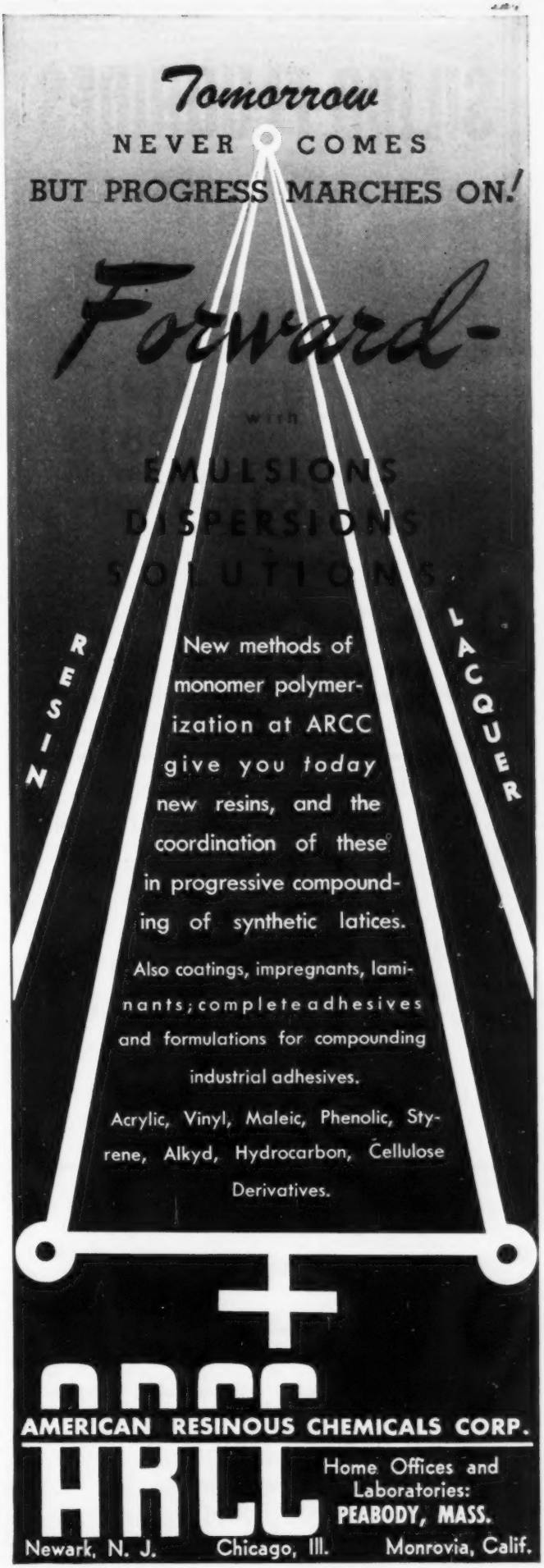
USP $25 higher; Prices are f.o.b. N. Y., Chicago, St. Louis, deliveries ½c higher than NYC prices; *y* Price given is per gal; *c* Yellow grades 25c per 100 lbs less in each case; *d* Prices given are Eastern schedule, *a* Powdered boric acid $5 a ton higher; *b* Powdered citric acid is ½c higher.

	Current Market	1944 Low	1944 High	1943 Low	1943 High
Barium Carbonate precip, wks bgs. ton	60.00	75.00	55.00	75.00	55.00	65.00
Chloride, tech, cyst, bgs, zone 1 ton	73.00	78.00	73.00	90.00	77.00	90.00
Barytes, floated, bbls. ton	...	36.00	...	36.00	...	36.00
Bauxite, bulk mines ton	7.00	10.00	7.00	10.00	7.00	10.00
Benzaldehyde,tech,cbys,dms lb.	.45	.55	.45	.55	.45	.55
Benzene (Benzol), 90%, Ind. 8000 gal tks, ft all'd gal.	...	.15	...	.15	...	.15
Benzyl Chloride, cbys lb.	.22	.24	.22	.28	.22	.25
Beta-Naphthol, tech, bbls, wks ton	.23	.24	.23	.24	.23	.24
Bismuth metal, ton lots lb.	...	1.25	...	1.25	...	1.25
Blanc Fixe, 66⅔% Pulp, bbls, wks ton	40.00	46.50	40.00	46.50	40.00	46.50
Bleaching Powder, wks, 100 lb.	2.50	3.60	2.50	3.60	2.50	3.60
Borax, tech, c-l, bgs ton	...	45.00	...	45.00	...	45.00
Bordeaux Mixture, drs lb.	.11	.11½	.11	.11½	.11	.11½
Bromine, cases lb.	.25	.30	.25	.30	.25	.30
Butyl, acetate, norm drs, lb.	.1895	.1945	.1755	.1945	.1575	.1840
Cadmium Metal lb.	.90	.95	.90	.95	.90	.95
Calcium, Acetate, bgs. 100 lb.	3.00	4.00	3.00	4.00	3.00	4.00
Carbide, drs ton	50.00	95.00	50.00	95.00	50.00	95.00
Carbonate, c-l bgs, ton	18.00	25.00	18.00	25.00	18.00	22.00
Chloride, flake, bgs c-l ton	18.50	35.00	18.50	35.00	18.50	35.00
Solid, 73-75% drs, c-l, ton	18.00	31.50	18.00	31.50	18.00	31.50
Gluconate, U.S.P., drs. lb.	.57	.58	.57	.58	.57	.58
Phosphate, tri, bbls, cl lb.	...	.0635	.0635	.0785	.0635	.0785
Camphor, U.S.P., gran, powd, bbls lb.	.69	.71	.68½	.71	.68½	.70½
Carbon Bisulfide, 55-gal drs lb.	.05	.05¾	.05	.05¾	.05	.05¾
Dioxide, cyl lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, Zone 1, 52½ gal. drms lb.	.73	.80	.73	.80	.73	.80
Casein, Acid Precip, bgs, 100 or more lb.	...	.24	...	.24	...	.24
Chlorine, cyls, lcl, wks, contract lb.	...	.07¼	...	.07¼	...	.07¼
cyls, c-l, contract lb. y	...	.05¼	...	.05¼	...	.05½
Liq, tk, wks, contract 100 lb.	...	1.75	...	1.75	...	1.75
Chloroform, tech, drs lb.	.20	.23	.20	.23	.20	.23
Coal tar, bbls, crude bbl.	8.25	8.75	8.25	8.75	8.25	8.75
Cobalt Acetate, bbl lb.	...	.83¾	...	.83¾	...	.83¾
Oxide, black kgs lb.	...	1.84	...	1.84	...	1.84
Copper, metal 100 lb.	12.00	12.50	12.00	12.50	12.00	12.50
Carbonate, 52-54%, bbls. lb.	.19½	.20½	.19½	.20½	.19½	.20½
Sulfate, bgs, wks crypt. 100 lb.	5.00	5.50	5.00	5.50	5.00	5.50
Copperas, bulk, c-l, wks ton	...	14.00	...	14.00	...	14.00
Cresol, USP, drs lb.	.10¾	.11¼	.10¾	.11¾	.10¾	.11¾
Cyanamid, bgs ton	1.52½	1.62½	1.52½	1.62½	1.52½	1.62½
Dibutylamine, c-l, drs, wks lb.	...	.61	...	.61	...	.61
Dibutylphthalate, drs lb.	.2090	.2359	.1780	.2500	.2060	.2300
Diethylaniline, lb drs lb.	...	.40	...	.40	...	.40
Diethyleneglycol,drs,lcl.wks lb.	.14½	.15½	.14	.15½	.14	.15½
Dimethylaniline, dms.cl.,lcl lb.	.23	.24	.23	.24	.23	.24
Dimethyl phthalate, drs lb.	.1875	.1925	.1875	.1925	.1875	.2050
Dinitrobenzene, bbls lb.	...	.18	...	.18	...	.18
Dinitrochlorobenzene, dms lb.	...	.14	...	.14	...	.14
Dinitrophenol, bbls lb.	...	.22	...	.22	...	.22
Dinitrotoluene, dms lb.	...	.18	...	.18	...	.18
Diphenyl, bbls lcl. wks lb.	.16	.20	.16	.20	.15	.20
Diphenylamine bbls lb.	...	.25	...	.25	...	.25
Diphenylguanidine, drs lb.	...	.35	...	.35	.35	.37
Ethyl Acetate, tks, frt all'd lb.	.1070	.1175	.1070	.1175	.107	.110
Chloride, drs lb.	.18	.20	.18	.20	.18	.20
Ethylene Dichloride, lcl. wks, E. Rockies, dms lb.	...	.0891	...	.0891	...	.0842
Glycol, dms, cl. lb.	...	.10	...	.10	...	.10
Fluorspar, No. 1, grd. 95-98% bulk, cl-mines ton	...	37.00	...	37.00	...	37.00
Formaldehyde, c-l, bbls, kgs, wks lb.	.0520	.0750	.0520	.0570	.0550	.0575
Furfural tech, dms, c-l,wks lb.	...	.13	...	.13	...	.12½
Fusel Oil, refd, dms, dlvd lb.	.18½	.19½	.18½	.19½	.18½	.19½
Glauber's Salt, Cryst,c.l.,bgs, bbls. wks 100 lb.	1.05	1.25	1.05	1.25	1.05	1.25
Glycerin dynamite, dms, c-l, lb.	...	.14½	...	.14½	...	.18¾
Crude Saponification, 80% to refiners tks lb.	...	.11¼	...	.11¼	...	.12¾

GUMS

Gum Arabic, amber sorts bgs lb.	.11½	.13	.11½	.14	.13½	.17½
Benzoin Sumatra, CS lb.	.52	1.00	.52	1.00	.52	1.00
Copal, Congo lb.	...	.55¾	...	.55¾	...	.55¾
Copal, East India, chips lb.	...	.12	...	.12	...	.12
Macassar dust lb.	...	.07½	...	.07½	.07½	.11¾
Copal Manila,	.13½	.15½	.13½	.15½	.13½	.15½
Copal Pontianak, bold c-l lb.	...	.23½	...	.23½	...	.23½
Ester lb.	.11½	.12	.09½	.12	.09½	.12
Karaya, bbls, bxs, dms, lb.	.15	.46	.15	.46	.14	.40

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.
y Price given is per gal.



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35 Uraniastrasse, Zurich, Switzerland

Current Prices

Gums
Salt Cake

	Current Market	1944 Low	1944 High	1943 Low	1943 High
Kauri, N Y					
Superior Pale XXX....lb.	...	.65¾	...	.65¾	.65¼
No. 3 .....lb.	...	.23	...	.23	.22
Sandarac, cs .....lb.	.	.99½	...	.99½	1.40 nom.
Tragacanth, No. 1, cases lb.	4.50	5.00	4.00	5.25	4.00 5.25
No. 3 .....lb.	2.75	3.00	1.10	3.50	1.10 1.20
Yacca, bgs .....lb.	...	.06	.06	.07¼	.06 .07¼
Hydrogen Peroxide, cbys ..lb.	.15½	.18½	.15½	.18½	.15½ .18½
Iodine, Resublimed, jars..lb.	2.00	2.10	2.00	2.10	2.00 2.10
Lead Acetate, cryst, bbls...lb.	...	.12½	...	.12½	... .12½
Arsenate, St. bg, lcl ....lb.	.11½	.12	.11½	.12	.11½ .12
Nitrate, bbls .....lb.		.12½	...	.12½	... .12½
Red, dry, 95%Pb_3O_4, lcl lb.	.09¾	.10¼	.09	.11	.09 .11
97% Pb_3O_4 bbls delv..lb.	.09½	.11	.09¼	.11	.09¼ .11
98% Pb_3O_4, bbls delv..lb.	.09½	.10¾	.09½	.11¼	.09½ .11¼
White, bbls .....lb.	.08¼	.08¾	.08¼	.08¾	.08¼ .08¾
Basic sulfate, bbls, lcl lb.	.07½	.08	.07¼	.08	.07¼ .08
Lime, Chem., wks, bulk..ton	6.25	13.00	6.25	13.00	6.25 13.00
Hydrated, f.o.b. wks ..ton	8.50	16.00	8.50	16.00	8.50 16.00
Litharge, coml, delv, bbls lb.	.08	.09¾	.08	.09¾	.08 .09¾
Lithopone, ordi., bgs.....lb.	.04¼	.04¾	.04¼	.04¾	.04¼ .04¾
Magnesium Carb, tech, wks lb.	.06¼	.09¾	.06¼	.09¾	.06¼ .09¾
Chloride flake, bbls, wks c-l .....ton	...	32.00	...	32.00	... 32.00
Manganese, Chloride, Anhyd. bbls .....lb.	.15	.18	.15	.18	.14 nom.
Dioxide, Caucasian bgs, lcl .....ton	...	74.00	...	74.75	... 74.75
Methanol, pure, nat, drs gal *l*	.63	.76	.63	.76	.63 .76
Synth, drs cl.....gal. *m*	.31	.38	.31	.40½	.34½ .40½
Methyl Acetate, tech tks..lb.	.06	.07	.06	.07	.06 .07
C.P. 97-99%, tks, delv lb.	.09½	.10½	.09½	.10½	.09½ .10½
Chloride, cyl .....lb.	.32	.40	.32	.40	.31 .40
Ethyl Ketone,tks,frt all'd lb.	...	.09	...	.08	... .08
Naphtha, Solvent, tks ...gal.	...	.27	...	.27	... .27
Naphthalene, crude, 74°, wks tks .....lb.	...	.0275	...	.0275	... .0275
Nickel Salt, bbls, NY.....lb.	.13	.13½	.13	.13½	.13 .13½
Nitre Cake, blk .....ton	...	16.00	...	16.00	... 16.00
Nitrobenzene, drs, wks ...lb.	.08	.09	.08	.09	.08 .09
Orthonisidine, bbls .....lb.	...	.70	...	.70	... .70
Orthochlorophenol, drs ...lb.	.25	.27	.25	.32	... .32
Orthodichlorobenzene, drms lb.	.07	.08	.07	.08	.07 .08
Orthonitrochlorobenzene, wks .....lb.	.15	.18	.15	.18	.15 .18
Orthonitrotoluene, wks,dms lb.	...	.09	...	.09	... .09
Para aldehyde, 98%, wks lcl. .....lb.	...	.12	...	.12	... .12
Chlorophenol, drs .....lb.	...	.32	...	.32	... .32
Dichlorobenzene, wks ..lb.	.11	.15	.11	.15	.11 .15
Formaldehyde, drs, wks.lb.	.21	.22	.23	.24	.23 .24
Nitroaniline, wks, kgs..lb.	.43	.45	.43	.45	.43 .45
Nitrochlorobenzene, wks lb.	...	.15	...	.15	... .15
Toluenesulfonamide, bbls lb.	...	.70	...	.70	... .70
Toluidine, bls, wks ....lb.	...	.48	...	.48	... .48
Penicillin, hospitals, institutions, ampules per 100,000 units	2.40	2.60	2.40	4.50	... ...
For gov. purchases, ampules per 100,000 units	...	1.50	...	1.90	... ...
Pentaerythritol, tech. cl. lb.	.29	.33	.29	.33	.29 .35½

PETROLEUM SOLVENTS AND DILUENTS

Lacquer diluents, tks, East Coast .....gal.	...	11½	...	.11½	... .11
Naphtha, V.M.P., East tks, wks .....gal.	...	.11	...	.11	... .11
Rubber Solvents, standard, East, tks, wks ..gal.	...	.11	...	.11	... .11
Stoddard Solvents, East, tks, wks .....gal.	...	.10	...	.10	... .09½
Phenol, U.S.P., drs.....lb.	.10½	.11¼	.10½	.11¼	.10½ .13¼
Phthalic Anhydride, cl and lcl, wks .....lb.	.13	.14	.13	.14	.13 .15½
Potash, Caustic, wks, sol lb.	.06¼	.06¾	.06¼	.06¾	.06¼ .06¾
flake, 88-92% .....lb.	.07	.07½	.07	.07½	.07 .07½
liquid, tks .....lb.	...	.02¾	...	.02¾	.. .0275
dms, wks .....lb.	.03	.03½	.03	.03½	.03 .03½
Potassium Bichromate csks .....lb.	.09⅝	.10	.09⅝	.10	.09⅝ .10
Carbonate, hydrated 83-85% calc .....lb.	.05½	.05¾	.05½	.05¾	.05½ .05¾
Chlorate crys, bgs, wks lb.	.11	.13	.11	.13	.11 .13
Chloride, crys, tech, bgs, kgs .....lb.	.08	nom.	.08	nom.	.08 nom.
Cyanide, drs, wks .....lb.	...	.55	...	.55	... .55
Iodide, bots., or cans...lb.	1.44	1.48	1.44	1.48	1.44 1.48
Muriate, dom, 60-62-63% K_2O bulk unit-ton...ton	...	.53½	...	.53½	.53½ .56
Permanganate, USP, wks dms ..... lb.	.20½	.21	.20½	.21	.20½ .21
Sulfate, 90%, basis, bgs ton	...	36.25	...	36.25	... 36.25
Propane, group 3, tks... gal.	...	.03¾	...	.03¾	.. .03¾
Pyridine, ref., drms .....lb.	.45½	.46	.45½	.46	.45½ .46
R Salt, 250 lb bbls, wks lb.	..	.65	...	.65	... .65
Resorcinol, tech.,drms, wks lb	.68	.75	.68	.75	.68 .75
Rochelle Salt, cryst .....lb.	.43½	.47	.43½	.47	.43½ .47
Salt Cake, dom. blk wks .ton	...	15.00	...	15.00	... 15.00

l Producers of natural methanol divided into two groups and prices vary for these two divisions; *m* Country is divided in 4 zones, prices varying by zone.

° Spot price is ½c higher.

	Current Market	1944 Low	1944 High	1943 Low	1943 High
Saltpetre, grn, bbls ...100 lb.	8.20	8.60	8.20	8.60	8.20	8.60
Shellac, Bone dry, bbls ..lb.	r .42½	.46	.42½	.46	.42½	.46
Silver Nitrate, 100 oz, bots ....oz.	...	.32⅜	...	.32⅜	...	.32⅜
Soda Ash, 58% dense, bgs, c-l, wks .....100 lb.	...	1.15	...	1.15	...	1.15
58% light, bgs cl....100 lb.	1.05	1.13	1.05	1.13	...	1.13
Caustic, 76% flake drms, cl .....100 lb.	...	2.70	...	2.70	...	2.70
76% solid, drms,cl 100 lb.	...	2.30	...	2.30	...	2.30
Liquid, 47-49%, sellers, tks .....100 lb.	...	1.95	...	1.95	...	1.95
Sodium Acetate, anhyd. dms .....lb.	.08½	.10	.05	.10	.05	.06
Benzoate, USP dms ....lb.	.46	.52	.46	.52	.46	.52
Bicarb, tech., bgs., cl., works .....100 lb.	1.55	1.90	1.55	2.05	...	...
Bichromate,cks,wks l.c.l. lb.	.07½	.07¾	.07½	.07¾	...	.07¾
Bisfite powd, bbls, wks .....100 lb.	3.00	3.60	3.00	3.60	3.00	3.60
35° bbls. wks .....100 lb.	1.40	1.65	1.40	1.65	1.40	1.65
Chlorate, bgs, wks c.l. lb.	...	.06¼	...	.06¼	...	.06¼
Cyanide, 96-98%, wks ..lb.	.14½	.15	.14½	.15	.14½	.15
Fluoride, 95%, bbls, wks lb.	.07¼	.08¾	.07¼	.08¼	.07¼	.08¼
Hyposulfite, cryst, bgs, cl, wks .....100 lb.	...	2.25	...	2.25	...	2.25
Metasilicate, gran, bbl, wks c-l .....lb.	...	2.50	...	2.50	...	2.50
Nitrate, imp, bgs.....ton	...	33.00	...	33.00	...	33.00
Nitrite, 96-98% dom, cl. lb.	...	.06¾	...	.06¼	...	.06¼
Phosphate, di wks ..100 lb.	6.00	7.25	6.00	7.25	6.00	7.25
Tri-bgs, cryst, wks 100 lb.	2.70	3.40	2.70	3.40	2.70	3.45
Prussiate, yel, bbls, wks lb.	...	.11	.10	.11	.10	.11
Silicate, 52°,drs. wks 100 lb.	1.40	1.80	1.40	1.80	1.40	1.80
40°, drs, wks, c-l 100 lb.	...	.80	...	.80	...	.80
Silicofluoride, bbls NY ..lb.	.06½	.10	.06½	.12	.05	.12
Sulfate tech. Anhyd, bgs 100 lb.	1.70	1.90	1.70	1.90	1.70	1.90
Sulfide, cryst c-l, bbls, wks .....100 lb.	...	2.40	...	2.40	...	2.40
Solid, bbls, wks .....lb.	3.15	3.90	3.15	3.90	3.15	3.90
Starch, Corn, Pearl, bgs .....100 lb	...	4.08	...	4.08	...	3.47
Potato, bgs, cl .....lb.	...	.0637	...	.0637	...	.0637
Rice, bgs .....lb.	no stocks		no stocks		.09½	.10¼
Sweet Potato, bgs ..100 lb.	...	.09	...	.07½	...	.07½
Sulfur, crude, mines ....ton	...	16.00	...	16.00	...	16.00
Flour, USP, precp, bbls, kgs .....lb.	.18	.30	.18	.30	.18	.30
Roll, bbls.....100 lb.	2.40	2.90	2.40	2.90	2.40	2.90
Sulfur Dioxide, liquid, cyl lb.	.07	.09	.07	.09	.07	.08
tks, wks .....lb.	...	.04	.04	.06	.04	.06
Talc, crude, c-l, NY .....ton	...	13.00	...	13.00	...	13.00
Ref'd, c-l, NY .....ton	13.00	21.00	13.00	21.00	13.00	21.00
Tin, crystals, bbls, wks ..lb.	no stocks		no stocks		no stocks	
Metal .....lb.	...	.52	...	.52	...	.52
Toluol, drs, wks .....gal.	...	.33	...	.34½	...	.33
tks, frt all'd .....gal.	...	.28	...	.28	...	.28
Tributyl Phosphate, dms lcl, frt all'd .....lb.	...	.47	...	.47	...	.47
Trichlorethylene, dms, wks lb.	.08	.09	.08	.09	.08	.09
Tricresyl phosphate .....lb.	.24	.54½	.24	.54½	.24	.54½
Triethylene glycol, dms lcl lb.	.18½	.19½	.18½	.26	...	.26
Triphenyl Phos, bbls .....lb.	.31	.32	.31	.32	.31	.32
Urea, pure, cases .....lb.	...	.12	...	.12	...	.12
Wax, Bayberry, bgs .....lb.	no stocks		.25	nom.	.25	.26
Bees, bleached, cakes....lb.	...	.60	...	.60	...	.60
Candelilla, bgs crude...ton	.34½	.44½	.34½	.48	.38	.48
Carnauba, No. 1, yellow, bgs, ton .....lb.	...	.83¾	...	.83¼	...	.83¼
Xylol, Indus. frt all'd, tks, wks .....gal.	...	.27	...	.27	...	.27
Zinc Chloride tech fused, wks .....lb.	.05	.0535	.05	.0535	.05	.0535
Oxide, Amer, bgs, wks..lb.	.07¼	.07½	.07	.07½	.07	.07½
Sulfate, crys, bgs, ..100 lb.	3.40	4.15	3.40	4.35	3.60	4.35

Oils and Fats

Babassu, tks, futures ....lb.	...	.111	...	.111	...	.111
Castor, No. 3, bbls .....lb.	.13¾	.14¼	.13¾	.14¼	.13¾	.14¼
China Wood, drs, spot NY lb.	39½	.40	.39½	.40	...	.39
Coconut, edible, drs NY ..lb.	...	.0985	...	.0985	...	.0985
Cod Newfoundland, dms..gal.	.85	.88	.85	.90	...	.90
Corn, crude, tks, wks ....lb.	...	.12¾	...	.12¾	...	.12¾
Linseed, Raw, dms, c-l ...lb.	...	.1510	.1550	.1560	...	.1530
Menhaden, tks .....gal.	...	...	...	.1225	...	.1225
Light pressed, drs l.c.l. lb.	...	.1300	...	.1200	.1305	.1307
Oiticica, liquid, tks .....lb.	.18½	.18¾	.18½	.25	...	.25
Oleo, No. 1 bbls, NY ....lb.	.13¼	nom.	.13¾	nom.	.13¾	nom.
Palm, Niger, dms .....lb.	...	.0865	...	.0865	...	.0865
Peanut, crude, tks, f.o.b. wks .....lb.	...	.13	...	.13	...	.18
Perilla, crude dms, NY...lb.	no stocks		...	.245	...	.245
Rapeseed, New Orleans, bulk .....lb.	...	.1156½	...	.1156½	...	.1150
Red, dms .....lb.	.12¾	.13¾	.12¾	.14¾	.13¾	.14¼
Soy Bean, crude, tks, wks lb.	...	.1175	...	.1175	...	.1175
Tallow, acidless, bbls ....lb.	...	.14¼	...	.14¼	...	.14¼
Turkey Red, single, drs ..lb.	.9½	.13¾	.9½	.14½	.10	.14½

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 2c; Philadelphia deliveries f.o.b. N. Y., refined 6c higher in each case.

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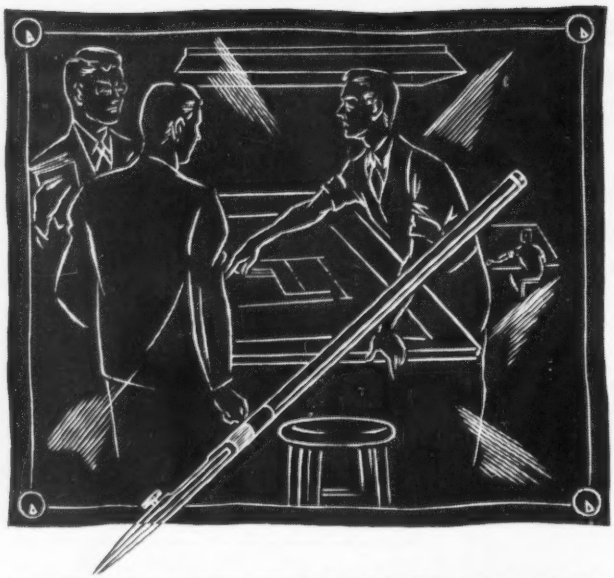

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"WE"-EDITORIALLY SPEAKING

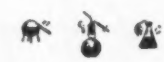
DID YOU EVER SEE a dream walking? We're not sure whether General Electric physicists have or not, but they have photographed sound waves. A parallel beam of light lasting four millionths of a second and a pair of optically flat mirrors do the trick.

ASTRONOMERS and physicists—and even physical chemists—are inclined to use large figures, like 6.06×10^{23}, and not care very much if they're a few thousand off. It is refreshing to find a man like the late Sir Arthur Eddington, who solemnly assures us that there are 15,747,724,136,275,002,577,605,653,961,181,555,468,004,717,914,527,116,709,366,231,425,076,185,631,031,296 protons in the universe, and the same number of electrons.

DOES RESEARCH pay off? In his Perkin Medal acceptance speech, Dr. Elmer K. Bolton of the Du Pont Company commented that in 1942 almost half of the gross sales of his company consisted of products which were commercially unknown in 1928.

WE RAN ACROSS a good word for scientists in E B. White's *One Man's Meat* the other day: "Although internationalism often seems hopelessly distant or impractical, there is one rather encouraging sign in the sky. We have, lately, at least one large new group of people to whom the planet *does* come first. I mean scientists. Science, however undiscriminating it has seemed in the bestowal of its gifts, has no disturbing club affiliations. It eschews nationality. It is preoccupied with an atom, not an atoll."

We think Mr. White has got something there. If we, as scientists, could discover the Avogadro's Law of decent behavior—or the first, second, and third laws of human dynamics—we should have progressed far towards establishing order in this chaotic world.



CHEMICAL WORKERS, we learn, are more satisfied with their wages than fellow workers in other fields. Only 38 per cent of those in the textile, leather, and apparels group were satisfied, but 65 per cent of the workers in chemicals, oil, coal, and rubber products said their wages were good.

IMMIGRANTS FROM JAPAN, here by our invitation, are two species of insects, one a wasp and the other resembling the common fly. They are supposed to be effective against the Japanese beetle and have been released in selected areas to control that pest.

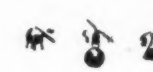
We wish this experiment more success than a similar one having to do with starlings, which, if we recall correctly, were imported to get rid of some insect pests. Now we would with joy get rid of the starlings.

NOW THEY ARE heating sidewalks with steam or hot-water coils to melt snow and prevent ice formation. A step in the right direction, but we're waiting for the day when concealed louvres, gently exhaling large volumes of warm, jasmine-scented air, will turn the cold and windy sidewalks of New York into a Miami Beach boardwalk.

WE HAVE GOT into the habit of thinking of chemicals in terms of coal, air, and water—with a nod, of course, towards oil, salt, and other minerals of the earth.

The chemurgists, though, clamor incessantly about the delights of Nature's bounty in the form of lush green fields—and with good reason. Consider the corn: The starch, we learn, is used in the textile, paper, and laundry industries; the syrup is used in rayon manufacture, in the tanning of leather, and in the curing of tobacco; the dextrins go into the manufacture of ink, mucilage, explosives, and plywood glues.

In our postwar utopia we shall find textiles in trees, rubber in the running wisteria, plastics in poppies, and good in everything.



EACH MAN AND WOMAN in uniform overseas, we learn, is issued a cellophane cape as a protection against possible gas attacks. Each cape uses as much cellophane as would wrap 1,450 packages of cigarettes. What we want to know is—where are the cigarette packages that the cellophane would wrap?

Fifteen Years Ago

From Our Files of January, 1930

Carbon Black Export Association, Inc., is formed under the Webb-Pomerene act by representatives of companies producing more than 92 percent of the world's output of carbon black, to promote the interests of American manufacturers of this commodity in foreign markets.

International Combustion Engineering Corp., and its two subsidiaries, International Combustion Tar & Chemical Corp., and Combustion Engineering Corp., are placed in hands of receivers on application of Bethlehem Steel Corp.

Monsanto Chemical Works, through its European subsidiary Graesser-Monsanto Chemical Works, London, purchases Sunderland tar distilling works of Brotherton & Co., Durham, England. This step is the most recent in the Monsanto program of expansion which previously had included acquisition of the Merrimac Chemical Co., the Commonwealth division, Mathieson Alkali Works, Rubber Service Laboratories Co.; Elko Chemical Co. The Graesser-Monsanto Co. had also previously acquired the British Saccharin Mfg. Co.

Chilean nitrate producers propose curtailing production. The excess production of Chilean nitrate beyond the present world demand is estimated to be between 400,000 and 500,000 tons annually. By closing down the less efficient producers it should be possible to eliminate this excess.

Industrial alcohol production for 1930 is reduced by 15 percent as compared with last year's output, according to an order issued by Commissioner of Prohibition, Dr. James M. Doran.

American Potash & Chemical Corp. now holds large interest formerly held by Goldfields American Development Co., subsidiary of South Africa, Ltd., in the operations at Searles Lake.

I. G. Farbenindustrie concludes truce with other members of Germany's nitrate industry towards an agreement aimed to curtail overproduction.

American Manganese Fertilizer Corp., Alexandria, Va., is formed with capital of $550,000 to explore, develop and operate mines and manufacture fertilizers. Albert S. Dulin is president.

Newport Chemical Works, Inc., Passaic, N. J., announced a new fast dye, Acid Anthraquinone Blue Sawsa.

PART 2: PATENTS AND TRADEMARKS

Abstracts of U. S. Chemical Patents

A Complete Checklist Covering Chemical Products and Processes

Printed copies of patents are available from the Patent Office at 10 cents each. Address the Commissioner of Patents, Washington, D. C., for copies and for general information concerning patents or trade-marks.

From Official Gazette—Vol. 567, No. 5—Vol. 568, Nos. 1, 2, 3 (Oct. 31—Nov. 21, '44) p. 544

*Rubber

Rubber composition of low water soluble salt content containing as a blowing agent a concentrated solution of ammonium nitrite in a polyhydric alcohol consisting of carbon, hydrogen and oxygen. No. 2,360,049. George Cuthbertson to United States Rubber Co.

Segregation of an agent for plasticizing rubber-like materials, from acid sludge. No. 2,360,320. Robert Ferguson to Standard Oil Development Co.

Vulcanized rubber product obtained by heating rubber and sulfur in presence of a mercaptobenzothiazole reaction product. No. 2,360,449. Robert Sibley to Monsanto Chemical Co.

Improving physical properties of a rubber which comprises treating with a chlor diphenyl unsubstituted except for chlorine. No. 2,360,450. Robert Sibley to Monsanto Chemical Co.

Rubbery composition of improved tackiness comprising a rubbery butadiene-1,3 acrylonitrile copolymer and, as a tack-imparting softener an alkyl substituted phenol. No. 2,360,864. Charles Fryling to The B. F. Goodrich Co.

Synthetic rubber prepared by copolymerizing butadiene-1 3 and acrylonitrile and, as a softener therefor, isophorone. No. 2,360,865. Benjamin Garvey to The B. F. Goodrich Co.

Synthetic rubber prepared by copolymerization of a butadiene-1,3 hydrocarbon and an alpha methylene nitrile and, as a softener therefor, an ester of an aromatic monocarboxylic acid with an alcohol. No. 2,360,866. Benjamin Garvey to The B. F. Goodrich Co.

Synthetic rubber cement comprising a copolymer of butadiene-1,3 with acrylonitrile and a liquid nitroparaffin to dissolve all said copolymer present to form a liquid free-flowing solution. No. 2,360,867. Benjamin Garvey to The B. F. Goodrich Co.

Softener for synthetic rubber, a diester of a polyalkylene glycol with an aliphatic monocarboxylic acid containing from 3 to 8 carbon atoms. No. 2,360,895. Donald Sarbach to The B. F. Goodrich Co.

Softener for synthetic rubber, an ester of aconitic acid with a monohydric alcohol containing from 2 to 8 carbon atoms. No. 2,360,896. Donald Sarbach to The B. F. Goodrich Co.

Synthetic rubber prepared by polymerization of a butadiene-1,3 hydrocarbon and, as softener therefor, member of class consisting of benzyl alcohol and alkyl ethers of benzyl alcohol. No. 2,360,897. Donald Sarbach to The B. F. Goodrich Co.

Synthetic rubber prepared by copolymerizing butadiene-1,3 and acrylonitrile and as a softener therefor, a terpinyl methyl ether. No. 2,360,898. Donald Sarbach to The B. F. Goodrich Co.

Rubber-reinforcing cord joined to vulcanized rubber by means of comprising, as bonding agent, a non-resinous, non-polymeric tannin-amine reaction product. No. 2,360,946. Albert Hershberger to E. I. du Pont de Nemours & Co.

Production of vulcanized rubber compositions which comprises compounding with rubber a composite amino reaction mixture resulting from reaction of an amino substance with a reaction mixture containing carboxylic acid and non-acid oxygenated bodies. No. 2,360,990. Edward Van Valkenburgh, three-fourths to Amino Products Corp.

Preserving latex which comprises adjusting pH of latex to not less than 9.8 nor more than 10.0 and adding a zincate. No. 2,361,070. William Stewart to The B. F. Goodrich Co.

*Textiles

Dyeing of polyvinyl halide-acetate copolymer fibers and fabrics. No. 2,359,735. Roy Kienle and Frederick Petke to American Cyanamid Co.

Bolting cloth, grit gauze and like, consisting of nylon threads and having mesh fixed by a resin-like polyhydric alcohol-polybasic acid condensation product together with an organic compound. No. 2,360,245. Robert McFarlane to Courtaulds Ltd.

Sizing cellulose acetate rayon yarn which comprises depositing on yarn aqueous emulsion of sperm oil gel dispersed in aqueous medium by means of triethanolamine oleate. No. 2,360,246. James McNally to Eastman Kodak Co.

Making waterproof tracing cloth. No. 2,361,082. Nathan Brown.

In process of treating textile fiber with water-repellency agents, the improvement which consists of simultaneously treating fiber with a thermoplastic water-insoluble resin selected from polymers and interpolymers of vinyl derivatives. No. 2,361,270. Lucius Collins, George Slowinske and Joseph Smith to E. I. du Pont de Nemorus & Co.

*Water, Sewage and Sanitation

Measuring partial pressure or quantity of moisture present in a atmosphere. No. 2,359,278. Albert Allen and Wilfred Howe to The Foxboro Co.

In purification of drinking water and like, method of producing a coagulum of aluminum hydroxide prior to filtration. No. 2,359,281. Orrin Andrus.

Softening water, by subjecting sludge containing particles of calcium carbonate and magnesium hydroxide precipitates suspended therein to centrifugal forces. No. 2,359,748. Robert Clemens to The Dorr Co.

Water treating plant. No. 2,359,991. Walter Hinsch to Dearborn Chemical Co.

Preparing a water-insoluble anion exchange product comprising reaction humic material derived from natural decomposition of vegetable matter with nitric acid and reacting nitrated material with a reducing agent. No. 2,360,195. Wesley Brittin to The Permutit Co.

Reducing adhesiveness of surfaces of adhesive organic plastic interlayer sheeting comprising polyvinyl butyral resin containing acetal and an ester plasticizer therefor. No. 2,360,712. Louis Paggi to E. I. du Pont de Nemours & Co.

Treating water for steam boilers, which comprises supplying molecularly dehydrated phosphate of bivalent and trivalent metals, subjecting treated water to heat and pressure in a boiler and precipitating calcium orthophosphate. No. 2,360,730. George Smith.

Treating waste liquids having septical suspended particles. No. 2,360,811. Earl Kelly and Arthur Kivari to The Dorr Co. Inc.

Treatment of waste liquids having oxygen-demanding liquid and suspended constituents including those particles of turbidity inhibitory to aerobic bacterial action. No. 2,360,812. Earl Kelly and Arthur Kivari to The Dorr Co. Inc.

*Miscellaneous

Gas purification system. No. 2,360,066. Jean Loumiet et Lavigne.

System for removing solids from a liquid which contains matter that is permanently coagulated by heat and matter that is temporarily coagulated by cold. No. 2,359,876. Frank Schwaiger to Anheuser-Busch, Inc.

Producing a luminous flame. No. 2,360,548. Leon Conway to Frederick Bloom.

Condensation products and process of preparing same. No. 2,361,093. Charles Graenacher and Richard Sallmann to Society of Chemical Industry in Basle.

Producing artificially smoked pipe bowl which comprises applying doughy to liquid composition consisting of solid non-combustible filler, a saccharifierous substance and alcohol to surface of cavity of pipe bowl. No. 2,361,243. Max David Schwab.

Combined chemical treatment, drying and chemical recovery system. No. 2,361,350. Charles Keep and Albert Ferre to B. F. Sturtevant Co.

Agricultural Chemicals

Insecticidal composition comprising as active toxicant an alkyl-substituted mono-nitro-naphthalene and a carrier therefore. No. 2,362,471. Robert Dreisbach and Fred Fletcher to The Dow Chemical Co.

Insecticide containing as essential ingredient a fluoride of amines and polyamines of alkyls. No. 2,362,614. Jose Calva.

Increasing deposition of suspended insecticidal toxicants from an aqueous carrier. No. 2,362,760. Kenneth Maxwell to Shell Development Co.

Preparing concentrated phosphate fertilizer which comprises mixing ground phosphate rock and concentrated phosphoric acid. No. 2,361,444. Thomas Zbornik to The American Agricultural Chemical Co.

Insecticide. No. 2,362,128. Samuel Gertler and Herbert Haller to Claude R. Wickard, Secretary of Agriculture of the United States of America.

Manufacture of furfural by catalytic hydrolysis of pentosan-containing material to pentoses and dehydration of resulting pentoses to furfural, and simultaneous production of a fertilizer. No. 2,362,390. Harvey Millar to The Quaker Oats Co.

Reducing capillary capacity of a pavement subgrade soil mass, which includes displacing water contained in said mass, and impregnating mass with mixture of loam, binder, bituminous material, and water. No. 2,363,018. John Poulter to Koehring Co.

Treating plant buds to control their development which comprises applying to plant buds a plant hormone. No. 2,363,325. Albert Hitchcock and Percy Zimmerman to Boyce Thompson Institute for Plant Research.

Cellulose

Manufacture of horse hair substitute from artificial fibers of regenerated cellulose, which comprises incorporating in fibers resin-starting materials ranging between 10% to 20% of fiber weight to form a urea-formaldehyde resin. No. 2,363,019. Max-Otto Schurmann and Johann Holtz.

Preparation of fine cellulose flour. No. 2,362,528. Emil Balz, Andrew Kassay and William Williams, to Libbey-Owens-Ford Glass Co.

Dope esterification process of preparing a cellulose ester the acyl content of which consists of saturated monocarboxylic fatty groups of 2-4 carbon atoms, 90-100% of the acyl being acetyl. No. 2,362,575. Carl Malm to Eastman Kodak Co.

Preparing a lower fatty acid ester of cellulose having a high content of fatty acid groups of 3-4 carbon atoms. No. 2,362,576. Carl Malm to Eastman Kodak Co.

Laminar structure comprising cellulose ester support, a subbing layer consisting of a mixture of cellulose nitrate and a polyvinyl compound, and a layer of polyvinyl alcohol. No. 2,362,580. Gale Nadeau and Clemens Starck to Eastman Kodak Co.

Production of cellulose ethers. No. 2,362,900. Walter Groombridge and John Downing.

Providing article carrying protective coating of pitch with adherable cellulosic coating. No. 2,361,435. Milton Swartz and Kinloch Yellott to Farboil Paint Co. Inc.

Production of organic esters of cellulose of improved stability. No. 2,361,500. Robert Rowley to Celanese Corp. of America.

Pyrotechnic device comprising natural flammable cellulosic material im-

* Continued from last month (*Vol. 567, Nos. 1, 2, 3, 4*).

pregnated with composition consisting of solidified wax having dispersed therein flame-coloring composition. No. 2,361,711. Herbert Palmer Starner.

Coating ethyl cellulose without use of a solvent. No. 2,362,166. John Speicher to Hercules Powder Co.

Improving processing of regenerated cellulosic products by viscose process from wood pulp which comprises adding prior to completion of shredding alkali cellulose a polypropylene oxide. No. 2,362,217. Paul Schlosser and Kenneth Gray to Rayonier Inc.

Cartoon cell which includes: transparent sheet of cellulose acetate having matte surface and drawing on said surface; and layer of ethyl cellulose over said matte surface filling indentations thereof. No. 2,362,980. Joseph Ball to Walt Disney Productions.

Preparation of mixed esters of cellulose containing both the formyl and acetyl radicals, which comprises esterifying cellulose with formic-acetic anhydride. No. 2,363,091. George Seymour and Blanche White to Celanese Corp. of America.

Ceramics

Making ceramic bonded abrasive article. No. 2,361,784. Romie Melton, Henry Kirchner and Raymond Benner to The Carborundum Co.

Ceramic material adapted to be sealed to glass and consisting of heat-reaction product of mixture of steatite and a material selected from magnesia, zirconia and zirconium silicate. No. 2,363,067. James Lait to General Electric Co.

Making ceramic bonded abrasive articles. No. 2,363,146. Norman Robie to The Carborundum Co.

Chemical Specialties

Aqueous liquid rosin size composition resistant to crystallization upon storage and containing an alkali metal soap of a rosin having dissolved therein sulfur. No. 2,362,973. Jack Cassaday to American Cyanamid Co.

Compounded mineral oil comprising viscous mineral oil and, to stabilize oil against oxidation, a nitrogen base derivative. No. 2,363,012. Robert Miller and John Rutherford to Standard Oil Co. of California.

In a grease composition, to inhibit deterioration of grease, an oxidation inhibitor consisting of mixture of oil-soluble organic amine selected from phenyl a-naphthylamine, phenyl b-naphthylamine and di-phenylamine, and .4—1.5% of a zinc soap. No. 2,363,013. Arnold Morway and John Zimmer to Standard Oil Development Co.

Heating soybean oil with uncombined polyhydric alcohol containing 3 or more hydroxyl groups in presence of mixture of zinc oxide and lead sulfate. No. 2,363,016. Paul Oertling to The Glidden Co.

Cleaning pad comprising firm backer, and a mass consisting of solidified layer of sulphochlorinated oil bonded to backer and having numerous granules of same material embedded in its exposed surface. No. 2,363,064. David Israel.

Extreme pressure lubricating oil additive consisting of a sulfurized "phosphatidic material." No. 2,363,133. Clarence Loane and James Gaynor to Standard Oil Co.

Lubricating oil comprising mineral lubricating oil having incorporated an an oil-soluble compound which is reaction product of a methylol-forming aromatic compound with formaldehyde and a secondary amine. No. 2,363,134. Ruch McCleary to The Texas Co.

Manufacture of wall plates, wall coats, etc., made of a plaster or mortar hardening on drying, under influences of carbon dioxide. No. 2,363,226. Johan Brund to Svenska Cellulosa Aktiebolaget.

Production of a preservative wood impregnant from mixture of petroleum fractions boiling above 270° C. characterized by substantial percentage of materials of cyclic structure content and inherent but inhibited toxicity. No. 2,363,237. Jacquelin Harvey, Jr., one-half to Southern Wood Preserving Co.

Preservative wood impregnant, a reformed petroleum oil boiling between 210 C° and 355° C. No. 2,363,244. Jacquelin Harvey, Jr., and Robert White, Jr., and Joseph Vaughan, one-half to said Harvey, Jr., and one-half to Southern Wood Preserving Co.

Making units of flame coloring materials which comprises supplying discrete particles of flame coloring agent to a mold, pouring liquefied carrier into mold. No. 2,363,306. Jonathan Fiske.

Planographic printing plate comprising an unbacked sheet of supercalendered amyloid parchment paper. No. 2,363,311. Arthur Garrett to Dun & Bradstreet, Inc.

Producing high compression strength laminated mica members which comprises applying an alcoholic solution of iron-free shellac to mica flakes to produce sheets of from 0.005 to 0.020 inch in thickness. No. 2,363,323. Lawrence Hill to Westinghouse Electric & Manufacturing Co.

Molded V-ring insulation comprising mica flakes and a binder, the binder composed of solvent-free and iron-free shellac, the shellac containing reinforcing fabric of glass fibers carrying a polymerized vinyl derivative. No. 2,363,324. Lawrence Hill to Westinghouse Electric & Manufacturing Co.

Calking compound constituted of bentonite, fibrous material, and from group consisting of asphaltic, coal tar and mineral oil. No. 2,363,468. Duane Tollstrup.

Producing carbon and activating same, and products thereof. No. 2,362,463. Robert Boehm and Horace Hall to Masonite Corp.

Fumigant composition comprising a mixture of methyl bromide and monomeric ethyl isopropenyl ketone. No. 2,362,472. Robert Dreisbach and Fred Fletcher to The Dow Chemical Co.

Fumigant composition comprising monomeric methyl isopropenyl ketone as a major toxic ingredient. No. 2,362,475. Fred Fletcher and Robert Dreisbach to The Dow Chemical Co.

Fungicidal composition comprising a carrier and 5,6-dichloro-2-cyclohexenedione-1,4 as essential active ingredient. No. 2,362,563. Elbert Ladd to United States Rubber Co.

Fungicidal composition comprising a carrier and 2,2,4,6,6-pentachloro-3-cyclohexenedione-1,3 as essential active ingredient. No. 2,362,564. Elbert Ladd to United States Rubber Co.

Fungicidal composition comprising a carrier and 2,3,5,5,6,6-hexachloro-2-cyclohexenedione-1,4 as essential active ingredient. No. 2,362,565. Elbert Ladd to United States Rubber Co.

Fungicidal composition comprising a carrier and 2,3,5,6,6-pentachloro-4-methyl-2,4-cyclohexadienone as essential active ingredient. No. 2,362,594. William ter Horst to United States Rubber Co.

Continuous manufacture of soap. No. 2,362,734. Robert Ward to National Oil Products Co.

Lubricating grease comprising lithium soap, aluminum soap, and grease consisting of dibutyl phthalate. No. 2,362,767. John Morgan to Cities Service Oil Co.

Detergent, a salt selected from alkali metal, ammonium, and amine salts of a sulfation product of a pentaerythritol ester of a hydrogenated rosin. No. 2,362,882. William Carson, Jr., to Hercules Powder Co.

Wetting-out compositions comprising member selected from caprylic acid mono-esters of triethanolamine and salts thereof, and including fatty acid partial ester of member selected from glycerol and glycols. No. 2,362,894. Albert Epstein and Morris Katzman to The Emulsol Corp.

Neutral or slightly basic lubricating grease containing mineral oil, and oxidation inhibitor comprising phenylene diamine, dispersed with an ethanolamine. No. 2,361,391. Harold Fraser and Thomas Maxwell to International Lubricant Corp.

Obtaining fatty acids of improved color and odor from fatty acid stock containing unwanted components having higher and lower boiling temperature ranges by two successive stages of treatment. No. 2,361,411. John Murphy to Lever Brothers Co.

Fluxing material for cupola furnace having a refractory lining susceptible to re-action with fluxing material of all fresh limestone. No. 2,361,416. Herbert Reece.

Thermoplastic adhesive sealing composition for securing together fibre container joints, comprising homogeneous mixture of polymerized vinyl acetate and pine wood pitch. No. 2,361,418. John Robinson to American Can Co.

Printing ink for rapid drying by evaporation resulting in gelation without passing through stage of tackiness, consisting of pigment dispersed in vehicle composed of nitrocellulose dissolved in mono-ethyl ether of ethylene glycol and mono-ethyl ether of diethylene glycol with addition of paraffin wax compound. No. 2,361,442. Herbert Wolfe and Paul Greubel to American Can Co.

Paving mixture comprising mineral aggregate bonded with bituminous material containing an organic imidazoline. No. 2,361,488. Louis Mikeska to Standard Oil Development Co.

Printing ink stable on typographic press, comprising a gel of pigment, glycerin and water-soluble alkali silicate. No. 2,361,505. Edward Sheridan to Interchemical Corp.

Separation of soaps and acids thereof. No. 2,361,547. Vance Jenkins and Chester Wilson to Union Oil Co. of California.

Slag deoxidation with finely divided ferro-silicon. No. 2,361,627. Charles Herty, Jr., to Bethlehem Steel Co.

Extruding zein through orifices forming threads, and passing threads into bath comprising formaldehyde and kieselguhr. No. 2,361,713, Oswald Sturken, fifty per cent to Harriet Sturken and fifty per cent to Sidney Reich.

Printing ink which is solid at normal temperatures and melts to a fluid printing consistency at elevated temperatures. No. 2,361,740. Jesse Boggs and Lothian Burgess to J. M. Huber, Inc.

Lubricating composition comprising a hydrocarbon lubricating oil having dissolved therein heavy metal salt of a dithiophosphoric acid ester and a metal salt of a dialkylphenol sulfide. No. 2,361,746. Elmer Cook and William Thomas, Jr., to American Cyanamid Co.

Making lubricating oils, which comprises subjecting uncracked lubricating oil stock to at least five pounds per barrel of sulphuric acid. No. 2,361,787. John Musselman to The Standard Oil Co.

Producing carbon black by impingement process which comprises mixing natural gas, prior to its issue from the burner, with an inert non-combustible gas. No. 2,361,802. Ira Williams and Robert Takewell to J. M. Huber Corp.

Manufacture of detergent mineral lubricating oil comprising combining an oil-soluble alkylated phenol ether with mineral lubricating oil, an oxide of metal selected from calcium, magnesium, zinc and aluminum and water. No. 2,361,803. Chester Wilson to Union Oil Co. of California.

Lubricating oil comprising mineral lubricating oil and oil-soluble anti-corrosion non-carboxylic salt of a weakly acidic organic compound containing also detergent soap and water. No. 2,361,804. Chester Wilson to Union Oil Co. of California.

Lubricating oil comprising a mineral lubricating oil fraction, oil-soluble metal soap of acids derived from petroleum, and oil-soluble compound from condensation of a phenol with an alcohol. No. 2,361,805. Chester Wilson to Union Oil Co. of California.

Lubricating oil for severe service internal combustion engines. No. 2,361,806. David Merrill to Union Oil Co. of California.

Solder fluxing agent composed of keto fatty acids and substitution products thereof and a solid carrier for said material. No. 2,361,867. Leopold Pessel to Radio Corp. of America.

Lubricant comprising oil of lubricating viscosity and reaction product of phosphorus pentasulphide and naphthenic acid, and brucine. No. 2,361,957. John Musselman and Herman Lankelma to The Standard Oil Co.

Producing foaming fire extinguishing medium comprising mixture of calcium chloride, material of class including aluminum sulphate and potassium sulphate, powdered material of class including soap bark, licorice root and alfalfa root, soy bean flour, and also liquid constituting bicarbonate of soda and sodium chloride, and sulphuric acid. No. 2,361,980. Leslie Tirrell.

In removing volatile substances from soap-containing aqueous polymer dispersion by distilling, the method of reducing formation of foam during the distillation by including water-soluble polyvalent metal salt and alkali metal phosphate. No. 2,362,052. David Craig to The B. F. Goodrich Co.

Composite board comprising layer of set water-setting cement bonded to liners of fibrous material, said cement comprising calcium sulphate, blast furnace slag, and an exciter comprising available lime. No. 2,362,060. Joseph Etridge, John Sandford, and Victor Lefebure, to Imperial Chemical Industries, Ltd.

Lubricant comprising a mineral white oil and a lubricating metal soap. No. 2,362,233. John Bannon to Standard Oil Development Co.

Producing acetylated starch compounds. No. 2,362,282. Wesley Lindsay.

Metal cleaning composition for removal of metallic oxide, tarnish, or scale, comprising bentonite, glucono delta-lactone, wetting agent, admixed with tripoli and infusorial earth. No. 2,362,284. Louis McDonald.

Lubricating compositions. No. 2,362,289. Louis Mikeska to Standard Oil Development Co.

Lubricant. No. 2,362,290. Pharis Miller and Eugene Lieber to Standard Oil Development Co.

Lubricant. No. 2,362,291. Carl Winning to Standard Oil Development Co.

Lubricant. No. 2,362,292. John McNab to Standard Oil Development Co.

Lubricant. No. 2,362,293. John McNab and Walter Watkins to

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Standard Oil Development Co.

Metallic abrasive and blasting material made of spherical cast iron particles having a microstructure comprised of carbide and austenite, and carbon, manganese, silicon, nickel and iron. No. 2,362,310. Franklin Rote to The International Nickel Co., Inc.

Corrosion preventive composition for metals comprising a petroleum fraction, a saponaceous material and an organic amine. No. 2,362,332. John Zimmer and Ejnar Carlson to Standard Oil Development Co.

Dry stable detergent composition which yields in aqueous solution an oxidizing agent of high activity, said composition comprising a solid inorganic peroxygen compound, an organic acid anhydride, and a solid detergent. No. 2,362,401. Joseph Reichert, Samuel McNeight, and Arthur Elston to E. I. du Pont de Nemours & Co.

Normally solid thermo-fluid printing ink comprising coloring matter incorporated in resin base. No. 2,362,431. Lothian Burgess to J. M. Huber, Inc.

Coatings

Coating composition comprising water-soluble cellulose ether and a complex ester condensation product of a polyhydric alcohol and an inorganic polybasic acid. No. 2,362,761. Robert Medl, Jr., to Hercules Powder Co.

Sound deadening coating composition comprising blend of two air-blown asphalts. No. 2,362,839. Henri Marc to The Philip Carey Manufacturing Co.

Granular hot top composition composed of crushed, screened limestone to effect an endothermic reaction and generation of carbon dioxide gas when subjected to molten steel. No. 2,361,386. Thomas Eayrs.

Coating composition showing reflectance characteristics of leafy vegetation to the eye and to infra-red photography, which comprises a binder and mixture of colorants. No. 2,361,473. Walter Granville to Interchemical Corp.

Providing layer of textile fabric material with coating of unvulcanized rubber. No. 2,361,682. Josef Grabec.

Recovering excess coating material from spray chambers which comprises flowing over walls and washing air of said chambers with aqueous dispersion of finely divided asbestine, to which has been added a gum and a wetting agent comprising dioctyl sodium sulphosuccinate. No. 2,362,964. Gregor Affleck.

Coating materials and process for making them, comprising heating mixture of polylactylic acids and a fatty drying oil to cause mixture to become resinified. No. 2,363,103. Paul Watson to the United States of America, represented by Claude R. Wickard, Secretary of Agriculture.

Thinly fluid aqueous emulsion for protectively coating fresh fruits or vegetables against withering or shrinkage, which comprises waxy material emulsified with an amine soap, together with water. No. 2,363,232. Charles Cothran to Brogdex Co.

Coating surface with film of metallic silver having a high coefficient of reflection which comprises preparing and maintaining in separated relation separate solutions of silver ammonio nitrate and a reducing agent containing gloxal, and then mixing two to produce metallic silver. No. 2,363,354. William Peacock to Libbey-Owens-Ford Glass Co.

Dyes, Stains

Scarlet dyestuff represented by formula 3-amino-toluene-6-sulfonic acid →orthoansidine→metaamino - phenyl - pyrazolonecarboxylic acid →meta-amino-benzoyl-J-acid. No. 2,362,477. Joseph Froning to E. I. du Pont de Nemours & Co.

Monosulfonated azo dyestuffs. No. 2,362,548. Joseph Gyr and Raymond Gunst to Society of Chemical Industry in Basle.

Textile dyestuff decorating paste. No. 2,361,454. Norman Cassel to Interchemical Corp.

Red monazo wool dyes. No. 2,361,481. Donovan Kvalnes to E. I. du Pont de Nemours & Co.

Black tetrakisazo dyestuffs. No. 2,361,560. Mordecai Mendoza to Imperial Chemical Industries, Ltd.

Azo dyestuffs. No. 2,361,618. Friedrich Felix and Alphonse Heckendorn to Society of Chemical Industry in Basle.

Azo dyestuffs. No. 2,361,642. Emil Misslin and Rudolf Thomann to Society of Chemical Industry in Basle.

Stable dry composition for producing ice colors comprising an ice color coupling component, a mono alkali metal aluminate and an ice color diazo compound. No. 2,362,083. Jerry Mecco to American Cyanamid Co.

Dyeing yarns of vinyl polymers with aqueous dye bath containing suspension dyestuff, in presence of an organic compound selected from group consisting of 2,4-dichloraniline, etc. No. 2,362,375. Karl Heymann to American Viscose Corp.

Dyeing vinyl polymers with aqueous dye bath containing suspension dyestuff, in presence of water-insoluble, normally solid organic compound selected from group consisting of dibenzyl succinate, etc. No. 2,362,376. Karl Heymann to American Viscose Corp.

Dyeing vinyl polymers with aqueous dye bath containing a suspension dyestuff, in presence of an organic compound selected from group consisting of beta,beta'-diphenoxydiethylether, etc. No. 2,362,377. Karl Heymann to American Viscose Corp.

Manufacture of mordant dyestuffs of 2-aryl-1:3arylentriazole series. No. 2,362,988. Achille Conzetti and Otto Schmid to J. R. Geigy A. G.

Gray and taupe to brown anthraquinone dyes for animal and related fibers. No. 2,363,069. Henry Lee and Charles Young to E. I. du Pont de Nemours & Co.

Equipment

Device for indicating differences in fluid pressure in a plurality of pressure sources. No. 2,362,446. Albert Bodine, Jr., to The Calpat Corp.

Apparatus for electroplating an article of hollow-ware. No. 2,362,474.

THE RAYMOND BAG COMPANY, MIDDLETOWN, OHIO

Manufacturers of

RAYMOND *Multi-Wall* PAPER SHIPPING SACKS

Charles Elsenheimer to Manning, Bowman & Co.

Heavy density fluid flotation apparatus for separating the sinks from the floats of particulate materials. No. 2,362,482. Mack Haworth.

Manufacture of filament for electron discharge tubes and like, which comprise applying to a metallic core a coating composition. No. 2,362,510. Paul Stutsman to Raytheon Manufacturing Co.

Liquid filtering unit. No. 2,362,530. Dale Bennett to International Harvester Co.

Blowpipe apparatus. No. 2,362,535. James Bucknam to The Linde Air Products Co.

Intravenous injection equipment and method of operating same. No. 2,362,537. William Butler to Cutter Laboratories.

Apparatus for production of injection molded article containing performed insert adapted to enable article to be secured to stem or spindle by means of set screw. No. 2,362,583. Rene Piperoux to Celanese Corp. of America.

Automatic air volume control for a water system. No. 2,362,586. Arthur Ruth.

Feeder apparatus. No. 2,362,606. Lawrence Albertson and Henry Mueller to The McKays Co.

Feeder. No. 2,362,607. Lawrence Albertson to The McKays Co.

Apparatus for handling spinning solutions. No. 2,362,674. Lynwill Spangler and Harold Pratt to American Viscose Corp.

In analytical apparatus, a combustion furnace having a heating chamber, a combustion tube of refractory material and integral construction passing through said chamber and extending beyond front and beyond rear of furnace to relatively cool zones, said tube having opening for insertion of a combustion boat containing sample to be determined. No. 2,362,687. George Miller Dreher.

Apparatus for recovery of volatilizable metals. No. 2,362,717. Lloyd Pidgeon to Dominion Magnesium, Ltd.

Apparatus for extracting volatilizable metals from materials. No. 2,362,718. Lloyd Pidgeon to Dominion Magnesium Ltd.

Base block for supporting crucibles or the like in heating chamber of furnace. No. 2,362,823. George Hubbell to American Crucible Co.

Gauge for measuring level of liquefied gas confined under its own vapor pressure. No. 2,361,440. Hilding Williamson to Reconstruction Finance Corp.

Apparatus for controlling relative rate of flow in pipe-line loops in a liquid transfer system in which unlike liquids are transmitted in slugs. No. 2,361,478. Gerald Jennings to Phillips Petroleum Co.

Apparatus for combined agitating and cooling of a wax-oil dispersion. No. 2,361,503. August Schutte and Willem Klaassen.

Centrifugal pump adapted to displace or pump a liquid. No. 2,361,521. DeWitt Yates to W. S. Darley & Co.

Apparatus for separating oil from water contaminated therewith. No. 2,361,577. George Rodham and Henry Silley.

Catalyst chamber. No. 2,361,623. Jesse Guyer and Carl Helmers to Phillips Petroleum Co.

Etching printing plates. No. 2,361,665. William Toland and Ellis Bassist to said Toland, as trustee.

Measuring apparatus adapted to be governed by pressure changes in a gas handling apparatus. No. 2,361,723. Charles Wallace to Wallace & Tiernan Products, Inc.

Separator for fine particles. No. 2,361,758. Wladimir de Fligue.

Heater for fluids. No. 2,361,812. Marion Barnes to Universal Oil Products Co.

Centrifugal apparatus. No. 2,361,906. Gordon Anderson to Fairbanks, Morse & Co.

Welding rod feeding apparatus. No. 2,361,918. Albert Baird to The Linde Air Products Co.

Method of pulverizing difficultly frangible, fibrous material of vegetable origin. No. 2,361,922. Norwood Andrews to International Pulverizing Corp.

Concentrator apparatus. No. 2,361,927. Ronald Buckman to The Consolidated Mining & Smelting Co. of Canada, Ltd.

Apparatus for compressing gases. No. 2,361,939. Francis Gruss.

System for dehydrating a liquid product. No. 2,361,940. Joseph Hall to Drying & Concentrating Co.

Screening process for separating and classifving and effecting size-grading of mixture of dense granular particles of uniform kind in which the particles substantially all possess same electrical characteristics and are responsive to dispersing, orienting and projecting influence of an alternating electric field. No. 2,361,946. Robert Johnson and Reynolds Marchant to Minnesota Mining & Manufacturing Co.

Apparatus for smoothing and levelling thermoplastic coating material which has been deposited upon a sheet or web surface. No. 2,361,950. Russ Leech to Standard Process Corp.

Electrolytic cell. No. 2,361,974. James Smith, one-fourth to John Rietmann, and one-fourth to George Handel.

Apparatus for simultaneously culturing micro-organisms which require varying ranges of oxidation-reduction potential and carbon dioxide tension. No. 2,361,992. Abraham Cantor.

Apparatus for heating fluids. No. 2,362,107. John Wallis and John Throckmorton to Petro-Chem Process Co. Inc.

Steam generating system. No. 2,362,108. John Wallis and John Throckmorton to Petro-Chem Process Co. Inc.

Centrifugal extractor. No. 2,362,193. Ivanhoe Denyssen and Ross Pfalzgraff to American Viscose Corp.

Apparatus for conducting hydrocarbon conversion process which involves reaction between gaseous hydrocarbon and another gas in presence of catalyst. No. 2,362,196. Frederick Frey to Phillips Petroleum Co.

Determining moisture content of stalky forage material in raw state. No. 2,362,396. Robert Parks to The Ohio State University Research Foundation.

Electrical condenser comprising armatures separated by dielectric element comprising plurality of polar compounds, one of said polar compounds being a substituted benzene having at least five substituents, said substituents consisting of methyl and halogen groups. No. 2,362,428. Burnard Biggs and Stanley Morgan and Addison White to Bell Telephone Laboratories, Inc.

System for converting a liquefied gas into vapor. No. 2,362,968. Lyman Bliss and Odd Hansen to The Linde Air Products Co.

Method and apparatus for dispensing and conserving gas material. No. 2,362,984. George Boshkoff to The Linde Air Products Co.

Heat exchanger. No. 2,362,985. John Brown, Jr. to Brown Fintube Co.

Gas analyzer. No. 2,363,027. Louis Vayda and Joseph Stein.

Filtering device. No. 2,363,188. William McDorman to General Motors Corp.

Distillation apparatus. No. 2,363,246. Charles Hemminger to Standard Oil Development Co.

Process for distillation of organic liquids. No. 2,363,247. Clinton Holder to Standard Oil Development Co.

Portable sectional apparatus of variable capacity for dehumidifying air. No. 2,363,262. Richard Robinson to The Solvay Process Co.

Electron microscope. No. 2,363,359. Simon Ramo to General Electric Co.

Preparing in cell having cathode of low hydrogen overvoltage a quaternary ammonium hydroxide from a quaternary ammonium compound yielding salt-forming anions. No. 2,363,387. Louis Bock to Rohm & Haas Co.

Explosives

High explosive composition comprising liquid explosive nitric ester, nitrocellulose, and inorganic oxide in finely divided form taken from oxides of manganese, copper, titanium, lead, tin, or ferric iron. No. 2,362,617. Clyde Davis and Hartwell Fassnacht to E. I. du Pont de Nemours & Co.

Gelatin dynamite comprising a liquid explosive nitric ester, nitrocellulose, and a compound taken from metallic oxides, hydroxides, normal or basic salts of lead, iron, and aluminum. No. 2,362,618. Clarence Winning to E. I. du Pont de Nemours & Co.

Blasting explosive comprising admixture containing liquid explosive nitric ester, carbonaceous material, and calcium nitrate. No. 2,362,878. Leavitt Bent to Hercules Powder Co.

Fine Chemicals

Amine salts of polyhalo-phenols. No. 2,362,464. Edgar Britton and John Hansen to The Dow Chemical Co.

Preparing organic isocyanate by reacting amine corresponding thereto with phosgene, which comprises carrying out reaction in presence of a tertiary amine as catalyst. No. 2,362,648. Joy Lichty and Nelson Seeger to Wingfoot Corp.

Manufacture of a diaryl carbonate, which comprises reacting phosgene with phenol containing as promoting agent amphoteric metal phenate. No. 2,362,865. Sager Tryon and William Bendict to General Chemical Co.

Ethane-1, 2-bis - (N - octadecylsulphonamidomethylpyridinum chloride). No. 2,362,886. Donald Coffman and John Sauer to E. I. du Pont de Nemours & Co.

Alpha dichloro-beta monochloro-propionyl chloride. No. 2,361,552. Joy Lichty to Wingfoot Corp.

Diazine derivatives. No. 2,361,822. Gaetano D'Alelio and James Underwood to General Electric Co.

Preparing hydrocarbon-substituted melamines. No. 2,361,823. Gaetano D'Alelio and James Pyle to General Electric Co.

Production of estradiol compounds from delta 1,2,4,5-androstadienol-17-one-3 compounds. No. 2,361,847. Hans Inhoffen to Schering Corp.

Lactones of saturated and unsaturated cyclopentanopolyhydrophenanthrene series and process of preparing same. No. 2,361,964. Leopold Ruzicka and Tadeus Reichstein to Ciba Pharmaceutical Products, Inc.

Lactones of saturated and unsaturated cyclopentanopolyhydrophenanthrene series and process of preparing same. No. 2,361,965. Leopold Ruzicka and Tadeus Reichstein to Ciba Pharmaceutical Products, Inc.

Lactones of saturated and unsaturated cyclopentanopolyhydrophenanthrene series and process of preparing same. No. 2,361,966. Leopold Ruzicka to Ciba Pharmaceutical Products, Inc.

Preparing lactones of saturated and unsaturated cyclopentanopolyhydrophenanthrene series. No. 2,361,967. Leopold Ruzicka to Ciba Pharmaceutical Products, Inc.

Lactones and process of making same. No. 2,361,968. Leopold Ruzicka to Ciba Pharmaceutical Products, Inc.

Triethanolamine hydrochloride composition for coccidiosis. No. 2,362,003. Paul Harwood to Dr. Hess & Clark, Inc.

Preparing stable and highly colloidal solutions of lipins. No. 2,362,013. Carl Lautenschlager and Fritz Lindner and Adolf Mager to Winthrop Chemical Co. Inc.

Preparing alpha-aryl acrylonitriles. No. 2,362,049. Albert Clifford and John Long to Wingfoot Corp.

Dissolving cellulose triacetate in solvent selected from acetone, methyl ethyl ketone, methyl acetate, ethyl acetate, propyl acetate, methyl formate, ethyl formate and propyl formate. No. 2,362,182. William Baker to Bell Telephone Laboratories, Inc.

Ester of a halo-arloxy-substituted lower alcohol and an unsaturated aliphatic mono-carboxylic acid. No. 2,362,189. Gerald Coleman and Bartholdt Hadler to The Dow Chemical Co.

Making 4-ethyl-5-methyl metadioxane. No. 2,362,307. John Ritter to Standard Oil Development Co.

Producing 2-aminooxazole which comprises reacting urea with chloro acetaldehyde or bromo acetaldehyde. No. 2,362,337. George Anderson to American Cyanamid Co.

Anti-acid composition comprising mixture of calcium caseinate and calcium carbonate. No. 2,362,386. Werner Lipschitz to Lederle Laboratories, Inc.

Producing degradation products of steroid compounds having an aliphatic side chain at the 17-position. No. 2,362,405. Jacob Rosin.

Alpha-pyrones which are substituted in alpha'-position by a radical containing the cyclopentanopolyhydrophenanthrene ring structure. No. 2,362,408. Leopold Ruzicka to Ciba Pharmaceutical Products, Inc.

Compounds of 10:13-dimethylcyclopentanopolyhydrophenanthrene series. No. 2,362,439. Leopold Ruzicka to Ciba Pharmaceutical Products, Inc.

Demuriation catalyst which comprises mixture of a phosphate of an alkaline earth metal with a phosphate selected from cobalt, chromium and manganese. No. 2,363,011. John Michalek and Edwin Erickson to The Mathieson Alkali Works, Inc.

A triethanolamine-reacted sub-rubbery polymeric sulfur-converted triricinolein. No. 2,363,034. Gwynne Allen to Petrolite Corp. Ltd.

Tri-ethanolamine-reacted phthalic-acid-reacted sub-rubbery polymeric sulfur-converted tri-ricinolein. No. 2,363,035. Gwynne Allen to Petrolite Corp. Ltd.

Halogensubstituted unsymmetrical diphenyl urea sulphonic acids. No. 2,363,074. Henry Martin, Hans Zaeslin and Rudolf Hirt and Alfred Staub to J. R. Geigy A. G.

Making 6,10,14-trimethylpentadecanone-2. No. 2,363,092. Lee Smith and Joseph Sprung to Regents of the University of Minnesota.

Separating dimethyl hexanes from mixture of isomeric octanes, subjecting dimethyl hexanes to dehydrogenating cyclization reaction and blending product of reaction with isomeric octanes from which dimethyl hexanes were separated. No. 2,363,171. Alfred Francis to Socony-Vacuum Oil Co. Inc.

Isomerizing terphenyls which comprises reacting with an anhydrous aluminum halide. No. 2,363,209. Robert Swisher to Monsanto Chemical Co.

Manufacture of enol ethers of alpha, beta-unsaturated steroid ketones

From Official Gazette—Vol. 567, No. 5—Vol. 568, No. 1, 2, 3 (Oct. 31—Nov. 21, '44) p. 548

comprising reacting an alpha, beta-unsaturated ketosteroid with an alcohol and removing water formed. No. 2,363,338. Heinrich Koster to Schering Corp.

Acetonyl thioethers. No. 2,363,462. Glen Morey to Commercial Solvents Corp.

Symmetrical beta-aminoalkyl acetals. No. 2,363,464. Murray Senkus to Commercial Solvents Corp.

N-substituted amino alcohols and process of making same. No. 2,363,465. Murray Senkus to Commercial Solvents Corp.

Aminoalkanediols. No. 2,363,466. Murray Senkus to Commercial Solvents Corp.

Food

Inhibiting acid and gas formation in canned sugar-cured meats, which comprises incorporating lactose as only added sweetening ingredient. No. 2,362,441. Lloyd Jensen and Walter Hess to Industrial Patents Corp.

Producing starches from sweet potatoes. No. 2,361,498. William Richee to Stein, Hall & Co. Inc.

Production of sirup from fruit juice which comprises introducing whiting and magnesiu mcarbonate into the juice. No. 2,361,586. Sam Avis.

Packaging oxidizable juice by admission of juice into container and charging container with inert gas to provide atmospheric pressure within container. No. 2,361,640. Ronald McKinnis.

Treating sugar liquors to obtain rapid filtration and clarification of the liquor, which comprises passing through filter containing particles of finely divided diatomaceous earth and a water insoluble metallic phosphate floc. No. 2,362,357. Arthur Cummins to Johns-Manville Corp.

Process of dehydrating tomatoes and the juices thereof. No. 2,363,193. Henry Moore.

Packaging spray dried milk powder subject to deterioration by oxidation. No. 2,363,445. Helge Shipstead and Arthur Brant to The Borden Co.

Industrials, Chemicals, Inorganic

Reagent for testing for acetone consisting of mixture of anhydrous soluble nitroprusside, anhydrous sodium carbonate and anhydrous ammonium sulfate. No. 2,362,478. Alexander Galat to The Denver Chemical Manufacturing Co.

Translucent granular mineral material having individual granules coated with an opacifying coating comprising finely divided unfused color metalliferous material, said metalliferous material resulting from interaction of oxides of chromium and zinc and iron sulphate. No. 2,362,489. Clifford Jewett to Minnesota Mining & Manufacturing Co.

Producing low-carbon ferrochromium. No. 2,362,512. Marvin Udy.

Production of lead sulphide which comprises passing carbonyl sulphide over lead oxide. No. 2,362,670. Walter Schulze to Phillips Petroleum Co.

Making refractory mullite material having low glass content which comprises fusing mixture of silica and calcined bauxite. No. 2,362,825. Otis Hutchins to The Carborundum Co.

Regenerating a particle form solid adsorbent material contaminated by a carbonaceous deposit. No. 2,361,571. Thomas Simpson, John Payne and John Crowley, Jr., to Socony-Vacuum Oil Co. Inc.

Cleaning from chipped edges of copper oxide-copper rectifier units that portion of oxide containing low resistance paths, that comprises placing units in solution of sodium sulphate. No. 2,361,680. Robert Ehrhardt to Bell Telephone Laboratories, Inc.

Reduction of sulphur dioxide to hydrogen sulphide and free sulphur. No. 2,361,825. Thomas Doumani to Union Oil Co. of California.

Lime-dewatering process, wherein slimy unpressable acidic citrous waste is converted by alkaline reagent into a watery, pressable waste. No. 2,362,014. Arthur Lissauer and Julius Credo to Citrus Processes, Inc.

Continuously determining reactive sulphur content of a stream of sulphur-treated fluid. No. 2,362,278. Minor Jones to Standard Oil Development Co.

Drying a wet or pasty cemented carbide composition, which comprises closely surrounding it with common salt. No. 2,362,302. George Perry to Carboloy Co. Inc.

Making mobile core for golf ball or like which comprises mixture of metallic sulfate and metallic hydroxide, one of which carries water of crystallization. No. 2,363,059. Charles Greene and Reinhard Habermaier to The B. F. Goodrich Co.

Separating potassium chloride and potassium hydroxide from each other and from a solution containing them. No. 2,363,066. Edward Ladd to Innis, Speiden & Co.

Treating phosphor of group comprising metal tungstates and molybdates containing excess of oxide of metal. No. 2,363,090. Herman Schoenfeldt to General Electric Co.

Embedded-resistor electric heating element comprising body of embedding material of particles of refractory heat-conducting electrical-insulating material, bonded with magnesium pyrophosphate. No. 2,363,130. Basil Horsfield to Edwin L. Wiegand Co.

Regeneration of sodium hydroxidesodium sulfide cooking liquors whereby black ash recovered from spent liquor is subjected to carbonizing and burning to produce molten salt mixture consisting of sodium carbonate and sodium sulfide. No. 2,363,150. Walter Savell to The Mathieson Alkali Works, Inc.

System for dispensing liquod oxygen and distributing same as gas to consuming devices. No. 2,363,200. Paul Pew and Philip Rice to The Linde Air Products Co.

Making an electrical heating element which comprises mixing magnesium oxide and phosphoric acid. No. 2,363,329. Basil Horsfield to Edwin L. Wiegand Co.

Forming briquettes, bricks or solid agglomerates from loose fragments of inorganic substances which consists in mixing loose fragments with alkaline substance that yields hydroxyl ions in aqueous solution and element of silicon, aluminum, and zinc, and small quantity of moisture and forming mixture into briquettes. No. 2,363,371. James Vignos to Ohio Ferro-Alloys Corp.

Electrolytic preparation of capillary-active quaternary ammonium hydroxides. No. 2,363,386. Louis Bock to Rohm & Haas Co.

Industrial Chemicals, Organic

Fermentation process for production of ethanol. No. 2,362,451. Leo Christensen, one-third to Frank Robinson and one-third to John Ledbetter, Jr.

Pyrotechnic composition comprising a nitrate of an alkaline-earth metal, an organic halogen compound having a dissociation temperature lower than the inorganic halides, and a metallic fuel. No. 2,362,502. George Schladt to the Government of the United States of America, as represented by the Secretary of War.

Recovery of mixture of ethylene amines from aqueous solution thereof containing dissolved inorganic salt. No. 2,362,579. Irvin Murray and Radcliffe Edmonds to Carbide & Carbon Chemicals Corp.

Color forming compounds containing sulphonamide groups. No. 2,362,598. Paul Vittum, Willard Peterson, and Henry Porter to Eastman Kodak Co.

Treatment of sterol-containing substrates with oxalic acid. No. 2,362,605. Lester Yoder to Iowa State College Research Foundation.

Sulphonation of toluene to produce product comprising chiefly p-toluene sulphonic acid. No. 2,362,612. William Brown to Allied Chemical & Dye Corp.

Conversion of hydrocarbons. No. 2,362,621. Frank Fahnestock to Socony-Vacuum Oil Co Inc.

Lubricant comprising an oil and product obtained by reacting alkylated hydroxyaromatic compound with phosphorus sulfide and reacting resultant product with a sulfur chloride. No. 2,362,624. James Gaynor and Clarence Loane to Standard Oil Co.

Producing molded articles which comprises compounding mixture consisting of extracted pine wood pitch, lime, and a filling material. No. 2,362,627. Eustace Glycofrides to Owens-Illinois Glass Co.

Producing thermosetting material consisting mainly of extracted pine-wood pitch. No. 2,362,628. Eustace Glycofrides to Owens-Illinois Glass Co.

Removal of carbonyl sulphide from low-boiling hydrocarbon fluids which comprises passing said fluids in contact with reagent comprising adsorbent carrier impregnated with sodium plumbite solution. No. 2,362,669. Walter Schulze to Phillips Petroleum Co.

Manufacture of dinitrotoluene without the use of sulfuric acid. No. 2,362,743. Willard Crater to Hercules Powder Co.

Solvent for organic film-forming resinous formaldehyde condensation product. No. 2,362,858. Walter Reppe and Otto Hecht and Fritz Oschatz to General Aniline & Film Corp.

Viscous hydrocarbon oil having incorporated therein to inhibit absorption of oxygen by the oil, of an aliphatic amine salt of thiocyanic acid. No. 2,362,890. Melvin Dietrich to E. I. du Pont de Nemours & Co.

Recovering calcium citrate from dilute acid aqueous solution containing not over about 2.75% of citric acid. No. 2,362,906. Herbert Leo and Clarence Taylor to Mutual Citrus Products Co.

Crystalline addition compounds of 7-hydroxy sterols and an organic acid of two carbon atoms. No. 2,362,932. Hans Rosenberg and Howard Carroll to E. I. du Pont de Nemours & Co.

Copolymerization product of vinyl chloride and vinyl fluoride. No. 2,362,960. Charles Thomas to Monsanto Chemical Co.

Removing acetylene polymer impurities from crude acrylonitrile which comprises treating crude acrylonitrile with sulfuric acid. No. 2,361,367. Harold Davis and Herbert Newey to American Cyanamid Co.

Accelerating molecular distillation by causing flow of molecules to be torn from surface of flowing electrode and travel under acceleration of a direct current electrical field. No. 2,362,889. William Austin Darrah.

2,3.5,6-Tetra-ethers of tetrahydroxydioxane with monohydric alcohols. No. 2,361,456. Henry Chitwood to Carbide and Carbon Chemicals Corp.

Aminated chlorinated paraffins. No. 2,361,457. Charles Clark to The Mathieson Alkali Works, Inc.

Imidazole derivatives and process of preparing same. No. 2,361,472. Charles Graenacher and Jost Frei to Society of Chemical Industry in Basle.

Producing hydrocarbon oil solution of an alkaline earth metal sulphonate. No. 2,361,476. Harold Higbee and William Griesinger to The Atlantic Refining Co.

Copolymerized vinyl chloride and vinyl bromide containing vinyl bromide polymerized to a degree which would render vinyl chloride insoluble in ethylene dichloride if polymerized alone. No. 2,361,504. Winfield Scott and Raymond Seymour to Wingfoot Corp.

Film-forming composition for producing clear dull finish comprising a liquid vehicle capable of producing a hydrophobic film, and a hydrated calcium silicate. No. 2,361,515. William Weidlich to Interchemical Corp.

Extreme pressure lubricant comprising paraffinic lubricating oil base stock, a chlorine-sulfurized paraffinic hydrocarbon extreme pressure agent and aromatic solvent extract having a viscosity index as low as zero. No. 2,361,522. John Zimmer and George McNulty to Standard Oil Development Co.

Spasmolytic agent for producing peripheral paralysis in animal, comprising a beta-alkyl-substituted ethylamine derivative. No. 2,361,524. Hans-Georg Allardt and Karl Junkmann to Schering Corp.

Treating monohydroxy terpene alcohol selected from hydroxymenthenes and hydroxymenthadienes with dehydrogenation catalyst having dehydrogenating metal. No. 2,361,532. Richard Cox to Hercules Powder Co.

Producing diolefins. No. 2,361,539. Wilhelm Friedrichsen.

Removing impurities from aqueous solution of a salt of 1-naphthylacetic acid also containing precipitable impurities. No. 2,361,576. William Tomlinson, Jr., to American Cyanamid Co.

Tetrachloro fluorotoluene. No. 2,361,590. Burnard Biggs to Bell Telephone Laboratories, Inc.

Preparing pentamethyl fluorobenzene by methylating a mono-fluorobenzene. No. 2,361,591. Burnard Biggs to Bell Telephone Laboratories, Inc.

Producing saturated hydrocarbon from isoparaffinic and olefinic hydrocarbons. No. 2,361,600. Don Carmody to Standard Oil Co.

Making catalyst, which comprises mixing a crushed porous coke with mixture of powdered anhydrous phosphorus pentoxide and powdered solid high-melting point tar. No. 2,361,612. Harry Drennan to Phillips Petroleum Co.

Preparing polyamides which consists in passing an aqueous solution of a diamine-dibasic carboxylic acid salt through reaction assembly. No. 2,361,717. Guy Taylor to E. I. du Pont de Nemours & Co.

Treating a fibrous material with a water repellent agent consisting of solution of a zirconium salt of a volatile acid, and a dispersion of a chemically inert paraffin to produce a water repellent effect. No. 2,361,830. Oscar Edelstein to The Pond Lily Co.

Determining the oil and free water content of a core sample. No. 2,361,844. William Horner to Core Laboratories, Inc.

Additional patents on industrial chemicals—organic, leather, medicinals, paint and pigments, paper and pulp, petroleum chemicals, petroleum refining, photographic chemicals, resins and plastics, rubber, textiles, water sewage and sanitation, from above vols. will be given next month.

Abstracts of Foreign Patents

Collected from Original Sources and Edited

Those interested in obtaining further information concerning the patents reported below should communicate with the Patent Department, CHEMICAL INDUSTRIES. Photostated copies of Canadian patents are available from the Commissioner of Patents, Ottawa, Canada.

CANADIAN PATENTS

Granted and Published October 10, 1944 (Continued)

Production of protective enamel finish upon a metal article which consists in the application of a mixture of an alkyd resin type of wrinkle enamel and a clear formaldehyde base enamel, said application resulting in a smooth finish. No. 423,110. Canadian Marconi Co. (Herbert S. Jordan)

Method of manufacturing margarine and cooking fat by addition of water and milk to solid fat, working into a plastic mass, and adding glyceride oils. No. 423,114. Co-Operative Wholesale Society Limited. (John Edw. Green)

Plasticization of film of cellulose ester adapted for covering aircraft propellers by treating in a bath of ethylene dichloride, ethyl alcohol, and toluene, and ethylene glycol phthalate. No. 423,154. Rayoid Mfg. Co. Ltd. (George Stuart Adlington)

Process for the manufacture of pregnane-dione substituted-derivative. No. 423,155. Roche-Organon Inc. (Tadeus Reichstein)

Mechanical device for maintaining constancy of consistency of a fluid stream between two apaced points in an open vessel. No. 423,167. Thames Board Mills Ltd. (Frederick Charles Brammer, W. C. H. West)

Germicidal soap composition containing as active ingredients mineral oil-coated Chloramine T or Chloramine B, or combination thereof. No. 423,196. Emily E. Smith.

Granted and Published October 17, 1944

Hydraulic press valve design. No. 423,000. John Maurice Towler.

Extrusion of fused themoplastics by delivering thermoplastic feed to extrusion point by means of a feed pump at least the gland of which is surrounded by a liquid, non-solvent for the plastics, at a temperature above the melting point of the thermoplastic. No. 423,207. Henry Dreyfus.

Process for the production of artificial filaments, foils and films having substantial extension in two directions by extrusion. No. 423,208. Henry Dreyfus.

Production of bland marine oils free of fish odour and flavours by hydro-genation and treatment with activated carbon. No. 423,214. Douglas J. Hennessey.

Two-part tool for transposing wires. No. 423,219. Andrew McGregor.

Recuperative heat exchanger design for two gaseous media. No. 423,224. Torbjorn Vannerus.

Process for making films by shaping a solid polymer of ethylene above its softening temperature, cooling, and if necessary rolling or cutting into thin sheets. No. 423,230. Canadian Industries Ltd. assignee of Imperial Chemical Industries Ltd. (M. W. Perrin, J. G. Paton, E. G. Williams)

Method of forming an insulating coating on a wire by extrusion about said wire of ethylene polymer. No. 423,231. Canadian Industries Ltd. assignee of Imperial Chemical Industries Ltd. (M. W. Perrin, J. G. Paton, E. G. Williams)

Electric cable insulated with ethylene polymer of a molecular weight of at least 4000 and apparent crystalline structure. No. 423,232. Canadian Industries Ltd. assignee of Imperial Chemical Industries Ltd. (J. C. Swallow, M. W. Perrin)

Process of preparing ethyl acetate and kindred materials by reacting acetic acid and ethylene in presence of boron trifluoride dihydrate catalyst. No. 423,234. Canadian Industries Ltd. (Donald John Loder)

Production of a resin by reacting propiolic acid with glycerol at 80 to 175 degrees Cent. No. 423,237. Canadian Industries Ltd. (Alexander Douglas Macallum)

Preparing of a polyvinyl butyral resin by reacting polyvinyl alcohol and a butyraldehyde in presence of preformed methylol sulphonic acid. No. 423,238. Canadian Industries Ltd. (Gelu Stoeff Stamatoff)

Manufacture of beta cyanoacrylic acid esters by reaction of alkali metal cyanide with ester of alpha—chloroacrylic acid, in presence of water and water-miscible organic solvent for alpha—chloroacrylic acid ester. No. 423,246. Canadian Industries Ltd. (J. W. C. Crawford, Nancy McLeish, Thos. K. Wood)

Vinyl ester of tertiary carboxylic acid, such as campholic. No. 423,248. Canadian Industries Ltd. (Wm. E. Hanford, W. E. Mochel)

Rubber coated fabric the rubber surface of which has a top coating of vinyl resin—phenol—aldehyde resin as a dried film. No. 423,250. Canadian Industries Ltd. (Carl Martin Langkammerer, Wm. S. Gocher, Alfred J. Jennings)

Method of quenching extruded plastic articles. No. 423,251. Canadian Industries Ltd. (Donald Robert Hull)

Coating of filaments of polymeric amide for brush manufacture with polymer of ethylene oxide dissolved in organic volatile solvent. No. 423,252. Canadian Industries Ltd. (Roger Gordon Aitken)

Apparatus for stripping plastic insulation from the ends of insulated wire. No. 423,256. Canadian Industries Ltd. (C. R. Johnson, R. R. Nydegger, N. C. Wyeth)

Tooth reconstruction material composed of methyl methacrylate and up to 5 per cent by weight of methallyl methacrylate. No. 423,259. Canadian Industries Ltd. (Malcolm MacKenzie Renfrew)

A heater cord for electrical apparatus comprising two stranded nickel conductors insulated with neoprene and asbestos. No. 423,307. The International Nickel Co. of Canada Ltd. (Herbert David Tietz)

Apparatus for the recovery of volatile solvent in process of producing textile filaments from solvent solution. No. 423,338. Henry Dreyfus (Robert Wighton Moncrieff, Wm. Ivan Taylor)

Method of separating substances capable of forming foams of different rigidities by engendering foaming by means of gas agitation and utilizing fractional foam column separation. No. 423,342. Kodak-Pathe (Marcel Marie Bertrand Abribat)

Granted and Published Nov. 14, 1944.

Process for the treatment of cellulosic materials which comprises reacting them with an organic dicyanamide, such as methylene-cyanamide solution impregnation and heating impregnated materials to between 50 and 150 Cent. No. 423,720. Henry Dreyfus.

Method of manufacturing porcelain-lined range boilers. No. 423,722. Paul L. Fowler.

Nozzle for vaporizing burners having a plurality of openings of differing cross section and means for closing any number of said nozzle openings. No. 423,725. Carl Bernard Holm.

Mass produced wooden blocks of such a design as to permit rapid laying of wooden block factory flooring. No. 423,727. Gustaf Kahr.

Dandruff removing shampoo comprising 3.25 ounces of olive oil soap, 1 ounce of eucalyptus oil, and 35.75 ounces of water. No. 423,730. Arthur Larocque.

Electrical discharge apparatus for destroying insect life in a food product such as flour of such design that explosive dust hazards are minimized. No. 423,741 to 423,748 inclusive. Franklin S. Smith.

A paint brush with attached container so that the latter serves as a reservoir so that the whole becomes a "fountain brush." No. 423,752. Ira Jackson Woodford.

Heat curable resinous composition formed by partial condensation of formaldehyde and a diamino s-triazinyl carboalkoxycarbocylic carbamyl-methyl sulphide, with an incorporated curing reactant such as a chlorinated acetamide. No. 423,766. Canadian General Electric Co., Ltd. (G. F. D'Alelio)

Excess voltage protective device. i. e. lightning arrester, comprisinr two spaced terminal electrodes and valve element means bridging the space between the terminal electrodes composed of closely sized silicon carbide grains. No. 423,778. Canadian Westinghouse Co., Ltd. (Leon R. Ludwig, Frederick B. Johnson, Wm. E. Berkey)

Electrical insulator composed of a base member coated with a lead borate type of glass derived from a polyhydric alcohol solution of same, dried below 250 Cent. to provide an unfused coating. No. 423,790. Canadian Westinghouse Co., Ltd. (Robert N. Wenzel)

Fluorescent lamp starter switch design. No. 423,798. Canadian Westinghouse Co., Ltd. (Charles H. Hodgkins)

A bonded silicon carbide refractory in which the carbide grains are held together by 0.5 to 10 per cent silico-manganese metal alloy. No. 423,800. The Carborundum Co. (John Paul Swentzel)

Method and apparatus ior determining dielectric quality quanitative measurements. No. 423,808. Doble Engineering Co. (Edmund H. Povel, Eric A. Walker)

Apparatus for the selective heating and thereby selective flame hardening of metals. No. 423,810. Dominion Oxygen Co., Ltd. (Hiram B. Gilson)

Belting construction wherein high tensile warp threads are combined with tubular weftwise textile constructions, said tubular construction improving the flexibility and joining of the belt and which may be inside-lubricated by incorporation therein of talc, graphite, zinc stearate or the like. No. 423,811. Dunlop Tire and Rubber Goods Co., Ltd. (Wilfrid Lord, Sidney Albert Brazier)

Electron multiplier picture tube design. No. 423,713. Electric & Musical Industries, Ltd. (Hans G. Lubszynski)

Apparatus for flame conditioning the welded-on overlay of protective metal upon a metal article of revolution. No. 423,814. Electro Metallurgical Co. of Canada, Ltd. (William A. Wissler, Robert L. Wagner)

Oil filter pack design wherein the drip and sludge separators are alter-nately arranged and superimposed. No. 423,816. Fyfe Oil Filters, Ltd. (Lloyd Wesley Nourse)

Process of producing aqueous rosin sizing dispersion containing high pro-portion of free rosin on the dry basis, and stable against flocking, which comprises passing acidific gas into an aqueous dispersion of saponified rosin. No. 423,820. Hercules Powder Co. (Robert T. Mashburn)

Method of making high density dry size by spray drying liquid or paste size to between 1 and 10 per cent moisture, compacting, crushing, and screen sizing. No. 423,821. Hercules Powder Co. (Ernest S. Wilson)

Method of forming an adherent solderable layer on a refractory non-metallic base, comprising forming on the base a coating of a suspension of particles of low-alkali glass and a silvering material, heat treating to form a coherent layer, and scouring to expose substantial quantities of silver at the surface of the layer. No. 423,857. Marinus Gerard van Bruggen.

Ductile manganese base alloy which resists embrittlement at elevated temperatures and is therefore useful as electrical resistor element, containing over 50 per cent manganese and between 15 and 50 per cent copper. No. 423,859. William Kroll.

Process of rectification concurrently with an operation of distillation which consists in the step of causing the vaporous products which

are to be rectified to flow at great velocity through the successive convolutions of a coil so that same are subjected to centrifugal forces several times stronger than gravity. No. 423,860. Juan Loumiet Y. Lavigne.

Granted and Published Nov. 21, 1944.

Electrostatic separator comprising pairs of rotatable electrodes, construction and arrangement being such that the electrostatic field between the electrode is unsymmetric with respect to a freely falling film of pulp. No. 423,863. Albert W. Morris.

Concentrator comprising long sloping reciprocating table, low walls at sides of table, cells covering table face, each cell having slotted walls and a floor of fibrous material such as corduroy. No. 423,864. Adam Barnard Bouwer, Leslie Dorfman.

Suction fan-based insect trap design. No. 423,866. James Bell.

A pomade composition consisting of petroleum jelly, 2¼ ounces; sodium bicarbonate, ¼ ounce; and 5 drops of a solution consisting of mineral oil, glycerine, and water. No. 423,870. Ettie Girty.

Grinding, lapping, or polishing machine for diamonds wherein means are provided to vary the radial position of the lapping path occupied by the stone on the cutting disc. No. 423,874. Frederick Charles Jearum.

Multi-ply tubular hose design. No. 423,884. Franklin Elijah Smith.

Pressure lubrication system, including main constant-pressure pump, interposed metering pump, and means whereby the metering pump is short circuited when starting up, and means for automatically closing the short circuit after a pre-determined time lag. No. 423,894. Armstrong Siddeley Motors, Ltd. (Thomas Clark, Edward Victor Windsor, Laurence Hart)

Composition suitable for lining salt water pits composed of intimate mixture of 10 to 30 per cent bitumen; 50 to 70 per cent soil; 30 to 70 per cent sawdust. No. 423,896. The Atlantic Refining Co.. (Joseph C. Becker)

Shoe stiffener comprising sheet felt foundation impregnated with water-free thermoplastic composition including rubber, wax, and as a dominant ingredient a dark colored coumarone-indene resin having a melting point range of 80-95 Cent., and an ash content of about 18 per cent. No. 423,905. Beckwith Manufacturing Co. (Adelbert P. Sewett)

Gas-filled electric incandescent lamp with a blackening control means disposed between filaments. No. 423,912. Canadian General Electric Co., Ltd. (Irving H. Van Horn)

Resinous composition comprising reaction product of melamine, formaldehyde, and an alpha-(diamino pyrimidyl thio acetamido) beta-(chloro-acetamido) ethane. No. 423,914. Canadian General Electric Co., Ltd. (G. F. D'Alelio)

Process for improved pigment dispersion in the manufacture of pigmented coatings, wherein a small amount of thinner is added to large quantity of pigment so that a dry-powdering composition is formed, which is rolled thoroughly and then diluted further with thinner. No. 423,917. Canadian Industries, Ltd. (Willard R. Barrett)

Process of removing formaldehyde from hydroxyaldehydes and ketones, which comprises acidifying, admixing excess methanol, maintaining at acetalizing temperature of 20 to 150 Cent., and vacuum distilling. No. 423,918. Canadian Industries, Ltd. (Carl Shipp Marvel)

Moisture coating composition obtained by heating introcellulose, 40 parts; paraffin wax, 2 parts; ethyl acetate, 400 parts; toluene, 160 parts; alkyd resin, 10 parts; dibutyl phthalate, 30 parts; for 15 days at 40 Cent., with stirring. No. 423,919. Canadian Industries, Ltd. (Geo. S. Heaven, Wm. Berry)

Process of splitting ethylidene diacetate by heating to form acetaldehype and acetic anhydride, which comprises adding to the liquid reaction mass of ethylidene diacetate a zinc halide catalyst, zinc oxide, and urea. No. 423,920. Canadian Industries, Ltd. (Frank O'Neil Cockerville)

The process of splitting ethylidene acetate by heating (as in foregoing) and utilizing zinc halide catalyst, zinc oxide, and acetamide. No. 423,921. Canadian Industries, Ltd. (Ferdinand Schulze)

Coating composition highly resistant to chalking or bronzing, comprising pigment, (normally subject to chalking), cellulose nitrate, plasticizer, and polyhydric alcohol-polybasic acid resin, modified with non-hydroxy non-drying oil. Such resin as reaction product of phthalic anhydride and trimethylene glycol particularly applicable. No. 423,922. Canadian Industries, Ltd. (George Raymond Ensminger)

Spongy, porous polymer of ethylene of apparent density of from 0.50 to 0.01, said polymer corresponding in composition to formula $(CH_2)x$, and having X-ray diffraction crystalline structure. No. 423,-923. Canadian Industries, Ltd. (Frederick Lewis Johnston)

Normally non-gelling, weather and oil resistant cellulose nitrate coating composition of stated formulation. No. 423,924. Canadian Industries, Ltd. (Walter Keigwin Moffett)

Polyamide solution, comprising of solution of synthetic linear polyamide in solvent mixture in 1:9—9:1 weight ratio, alcohol, and halogenated hydrocarbon, such as trichloroethylene and methanol. No. 423,925. Canadian Industries, Ltd. (Franklin Traviss Peters)

Composition of matter comprising a solution of synthetic linear polyamide in an unsaturated alcohol such as an allyl alcohol or an ethynyl-carbinol. No. 423,926. Canadian Industries, Ltd. (Franklin Traviss Peters)

Method of devulcanizing rubber by subjecting whole tire scrap to action of small proportion of thiophenol at 150 to 200 Cent., and dilute aqueous solution of sodium hydroxide at 160 to 200 Cent. to destroy fabric. No. 423,928. Canadian Industries, Ltd. (Arthur Morrill Neal, James Ralph Schaffer)

Apparatus useful in the manufacture of electric blasting caps, for facilitating threading through resilient tubular objects. No. 423,930. Canadian Industries, Ltd. (Donald George Ashcroft)

Process for the preparation of alkoxy substituted aldehydes by catalytic, vapour phase oxidation of alcohols. No. 423,931. Canadian Industries, Ltd. (Donald John Loder, Wm. F. Gresham)

Wire enamel comprising at least 25 per cent of a polyamide based on the non-volatile constituents of the enamel. No. 423,932. Canadian Industries, Ltd. (Stephen John Roskosky)

Polythene joining composition comprising mixture of one or two parts of polymerized ethylene having melting point above 100 Cent. and one part of a cyclo rubber. No. 423,933. Canadian Industries, Ltd. (Cyril Leonard Child, Robt. Bertram Fisher, Frank Clark, Bernard J. Habgood)

Stop-leak composition of following formula: Water, 700; tetrasodium pyrophosphate, 10; glue, 40; rosin, 40; monoethanolamine, 7.5; asbestos fibre, 40; sodium silicate, 25; ortho-phosphoric acid, 8.5. No. 423,834. Canadian Industries, Ltd. (John Lloyd Evans, Walter Alan Hall)

Process of preparing a stop-leak composition by heating drying oil with polyhydric alcohol at about 235 Cent. until product is substantially the mono-ester, adding rosin and heating to 255 Cent. to react free hydroxyl groups and rosin, and thereafter adding small amount of an amine. No. 423,935. Canadian Industries, Ltd. (Reynold Emanuel Holmen)

Process for tanning unpickled pelts which comprises tanning with chrome tanning agent in conjunction with water-soluble sodium adipate, the proportion of the latter salt to moles of Cr_2O_3 being from 1:1 to 1:1/. No. 423,936. Canadian Industries, Ltd. (J. Burchill, A. S. Callaghan, R. E. Hunnam)

Ignition composition for blasting initiators comprising a colloided nitrocellulose composition having a nitrogen content of at least 13-15 per cent. No. 423,937. Canadian Industries, Ltd. (Clifford Akeley Woodbury).

Thin, flexible, heat sealable film composed essentially of beta naphthol rubber and polymer of isobutylene. No. 423,939. Canadian Industries, Ltd. (James Albert Mitchell)

Regenerated cellulose base wrapping sheet having a coating composition essentially: cyclized rubber, 24 parts; paraffin wax m. p. 60 Cent., 3 parts; polybutene, mol. wt. 1,000, 3 parts. No. 423,940. Canadian Industries, Ltd. (James Albert Mitchell).

Sheet material coated with condensation product consisting of beta-naphthol rubber reacted with carbonyl compound from group consisting of acrylic acid, crotonic acid, methacrylic acid, cinnamic acid, maleic acid, itaconic acid, maleic acid anhydride, citraconic acid anhydride, and citric acid. No. 423,941. Canadian Industries, Ltd. (James Albert Mitchell)

Self-supporting, flexible, transparent sheet, composed of polyamide filaments enmeshed, with polymerized ethylene thereon, and method of manufacture of same. No. 423,942. Canadian Industries, Ltd. (George L. Dorough)

Rubber composition containing an N-(amino-aryl) 2, 5-dimethyl pyrrole as an atmospheric cracking inhibitor. No. 423,954. Dominion Rubber Co., Ltd. (Bernard Charles Barton)

Method of producing thrombokinase from rabbit brains. No. 423,964. The Kroger Grocery & Baking Co. (Norbert H. Volle)

Method of manufacturing pigment or filler composition by forming a slurry of amorphous carbon and calcium hydroxide, carbonating, so that amorphous carbon particles are intimately attached to the calcium carbonate so formed. No. 423,970. Marine Magnesium Products Corp. (Gunter Hugo Gloss, Robert E. Clarke)

Process of improving gloss of paper which comprises continuously advancing a paper web, and simultaneously rubbing opposite side of web with abrasive powder-lubricant composition. No. 424,020. S. D. Warren Co. (John W. Clark)

Abrasive wheel with novel method of keying in bonded abrasive slab segments. No. 424,029. Leon Nussbaum, Hatim Attari.

Process for production of acetone from steam and alcohol by heating same to 350 to 500 Cent. and employing catalyst consisting of ferric oxide and zinc oxide in a ratio of 3:2 to 2:1, under controlled pressure conditions. No. 424,030. Henry Dreyfus. (Walter Henry Groombridge)

Method of producing an elastic knitted fabric. No. 424,031. Henry Dreyfus. (Harold Bestwick Hayto, Wallace Blamire Mattinson)

Production of an aliphatic aldehyde by vapour phase heat treatment of a glycol in presence of acid reacting salt and a quantity of water equal to at least one-third of a molecule per molecule of glycol. No. 424,044. Henry Dreyfus.

Controlled dehydrohalogenation of halogen derivatives of olefines by passing said derivatives through a hot fluid bath of mainly zinc chloride with minor zinc oxide content. No. 424,045. Henry Dreyfus.

Thermoplastic compound, as new article of manufacture, comprised essentially of lignin, and one or more of materials of a class including gluten, rubber, proteins and casein, and a phenol condensate. No. 424,059. Marc de Becker Remy.

Process for making ricinoleic acid derivatives of alkylene and polyalkylene glycol monoalkyl and monoaryl ethers. No. 424,079. Carbide and Carbon Chemicals, Ltd. (Thomas F. Carruthers)

Preservation of organic substances such as rubber from oxidation deterioration by incorporating therein 1-(p-beta naphthyl amino phenyl) 3-phenyl 1,3 dialkyl cyclobutane. No. 424,090. Dominion Rubber Co., Ltd. (Philip Timothy Paul)

Lower molecular weight sulpho-mono-carboxylic acid esters of alcohols containing at least eight carbon atoms, hydrogen of the sulphonic groups of the sulpho-carboxylic acid radical being replaced by alpihatic amine radicals. No. 424,095. The Emulsol Corporation. (Benjamin R. Harris)

Spark plug electrode, resistant to lead, formed from cold drawn precious metal (platinum and molybdenum) alloy. No. 424,102. The International Nickel Co. of Canada, Ltd. (Leonard Bessener Pfeil)

Fibrous insulating tape which remains sticky over a long period of time and which can be applied at room temperature, impregnated or coated with polymerized styrene or polymerized substituted styrene having viscosity of 10^3 to 10^6 poises at 20 Cent. No. 424,103. International Standard Electric Co. (Archibald Alan New, Stanley G. Foord, D. R. Beckwith)

Compounded mineral lubricating oil of improved anti-corrosive properties containing small amount of zinc salt of di-isopropyl salicylic acid. No. 424,125. Shell Development Co. (Franz Rudolf Moser, Albert Johannes Dijksman)

Process for the production of porous fibrous plates rendered fireproof by admixture of fibrous suspension and fireproofing materials and subjected to foam forming process, wherein sulfite waste liquor is used as the foam forming material. No. 424,133. Svenska Cellulosa Aktiebolaget. (Ernst Aron Isodor Orrmell)

Self-locking nut design. No. 424,154. Oliver Edwin Simmonds (Edward Roker Robertson)

Device for irradiating a substance by electron discharge. No. 424,155. Henry A. De Phillips (Domenico Cascio, Stanley J. Koch)

Metal drawing compound comprising intimate mixture of 1 to 50 per cent of proteinaceous meal, i. e. peanut, flaxseed, soybean, pecan or cocoa bean meal, and 99 to 1 per cent of neutral petroleum lubricating oil having Saybolt viscosity of 100 to 750 inches at 100 Fahr. No. 424,-158. James E. Montgomery.

(*To be continued*)

Trademarks of the Month

A Checklist of Chemical and Chemical Specialties Trademarks

410,002. The Wilbur & Williams Co., Boston, Mass.; filed Oct. 23, 1943; Serial No. 464,383; for paints; since Sept. 1, 1943.

410,017. Neal H. Anderson, as Plastik Co. of America, Torrance, Calif.; filed June 17, 1944; Serial No. 471,329; for paint; since July 1, 1941.

410.251. Prufcoat Labs. Inc., Cambridge, Mass.; filed Sept. 10, 1943; Serial No. 463,330; for paint; since 1939.

410,399. The Dicalite Co., Los Angeles, Calif.; filed Oct. 13, 1943; Serial No. 464,104; for dehumidifying air; since Sept. 10, 1943.

410,409. Hinsdale Smith, Springfield, Mass.; filed Jan. 25, 1944; Serial No. 466,866; for photographic chemicals; since Sept. 15, 1943.

410,425. The Grapho-Detector Corp. of America, N. Y.; filed July 27, 1944; Serial No. 472,669, for detecting alterations in documents; since Aug. 1, 1940.

457,506. Phenoglaze Ltd., Croydon, England; filed Dec. 18, 1942; for paints; since Apr. 22, 1940.

458,327. Chromium Mining & Smelting Corp. Ltd., Sault Ste. Marie, Ontario, Canada; filed Feb. 4, 1943; for slag forming materials; since May 9, 1940.

460,681. The Stanley Chemical Co., East Berlin, Conn.; filed May 17, 1943; for paints; since July 1926.

462,610. Atlas Chemical Co. of Texas, Houston, Tex.; filed Aug. 9, 1943; for detergent; since Jan. 3, 1943.

464,908-9. The Atlantic Refining Co., Philadelphia, Pa.; filed Nov. 11, 1943; for oils; since Sept. 1, 1931.

465-569-573. Raw Asbestos Distributors Ltd., Rochdale, Lancashire, England; filed Dec. 6, 1943; for asbestos; since June 25, 1906; since Oct. 15, 1916.

466,932. Rohm & Haas Co., Philadelphia, Pa.; filed Jan. 27, 1944; for cleansing; since Mar. 16, 1935.

467,562. The Emulsol Corp., Chicago, Ill.; filed Feb. 19, 1944; for bactericide; since Sept. 4, 1941.

467,837. American Aniline Products, Inc., N. Y.; filed Feb. 29, 1944; for textile finisher; since Jan. 27, 1944.

469,807. Corn Products Refining Co., N. Y.; filed Apr. 29, 1944; for protein material; since Mar. 10, 1944.

470,036. Mound City Paint & Color Co., St. Louis, Mo.; filed May 8, 1944; for paint; since Apr. 21, 1944.

470,058. Jacques Wolf & Co., Passaic and Clifton, N. J.; filed May 8, 1944; for enzymic preparation; since June 1, 1937.

471,291. The Tremco Mfg. Co., Cleveland, Ohio; filed June 15, 1944; for corrosion resistant liquid coating; since Sept. 25, 1940.

471,296. United States Rubber Co., N. Y.; filed June 15, 1944; for foamed plastic; since May 4, 1944.

471,415. The Pervo Co., Los Angeles, Calif.; filed June 19, 1944; for paints; since May 29, 1944.

471,475. General Dyestuff Corp., N. Y.; filed June 21, 1944; for detergent; since Oct. 18, 1943.

472,095. Cerro De Pasco Copper Corp., N. Y.; filed July 11, 1944; for bismuth and tin; since Apr. 7, 1944.

472,148. W. W. Lawrence & Co., Pittsburgh, Pa.; filed July 12, 1944; for paints; since Sept. 1919.

472,321. General Dyestuff Corp., N. Y.; filed July 17, 1944; for alkali soluble finishes; since June 17, 1944.

472,431. Nuodex Products Co. Inc., Elizabeth, N. J.; filed July 20, 1944; for paint chemicals; since 1932.

472,503-4-5. California Spray - Chemical Corp., Wilmington, Del., and Richmond, Calif.; filed July 22, 1944; for parasiticides; since June 30, 1944.

472,653-4. L. Sonneborn Sons, Inc., N. Y.; filed July 26, 1944; for finishing oils; since Mar. 10, 1925; since June 15, 1936.

472,773. Louis Foss, as Foss & Co., Vineland, N. J.; filed July 31, 1944; for preserving wood; since Oct. 1943.

472,889. The Davison Chemical Corp., Baltimore, Md.; filed Aug. 3, 1944; for silica gel; since Jan. 14, 1943.

472,907. Reichhold Chemicals, Inc., Detroit, Mich.; filed Aug. 3, 1944; for plastic resins; since May 13, 1944.

472,934. Ciba Co. Inc., N. Y.; filed Aug. 4, 1944; for dulling compound; since Jan. 8, 1942.

472,936. Ciba Co. Inc., N. Y.; filed Aug. 4, 1944; for aldehyde triazine resins; since Aug. 31, 1940.

472,938-9. Ciba Co., Inc., N. Y.; filed Aug. 4, 1944; for textile detergent; since Mar. 14, 1940; since Mar. 8, 1940.

472,941. Crescent Bronze Powder Co., Chicago, Ill.; filed Aug. 4, 1944; for metallic paint; since 1925.

472,946. Oliver C. Eckel, as Stic-Klip Mfg. Co., Cambridge, Mass.; filed Aug. 4, 1944; for adhesive cement; since Jan. 10, 1943.

473,106. Monsanto Chemical Co., St. Louis, Mo.; filed Aug. 9, 1944; for synthetic resins; since July 24, 1944.

473,203. Air Reduction Sales Co., N. Y.; filed Aug. 12, 1944; for gas apparatus; since June 26, 1944.

473,263. American Cyanamid Co., N. Y.; filed Aug. 15, 1944; for shrinkage control of wool; since May 24, 1944.

473,337. Quaker Chemical Products Corp.; Conshohocken, Pa.; filed Aug. 16, 1944; for textile softener; since July 18, 1928.

473,398. Roxalin Flexible Finishes, Inc., Elizabeth, N. J.; filed Aug. 17, 1944; for adhesive; since 1925.

473,408. Canadian Industrial Minerals Ltd., Walton, Nova Scotia, Canada; filed Aug. 18, 1944; for barytes; since Feb. 7, 1944.

473,412. Dominion Magnesium Ltd., Toronto, Ontario, Canada; filed Aug. 18, 1944; for magnesium; since Oct. 12, 1942.

473,549. Stanley Home Products, Inc., Westfield, Mass.; filed Aug. 23, 1944; for glue; since July 26, 1944.

473,706. Quaker Chemical Products Corp., Conshohocken, Pa.; filed Aug. 29, 1944; for textile scouring; since Nov. 30, 1939.

473,790. Suprasol Ltd., Toronto, Ontario, Canada; filed Aug. 31, 1944; for soapless cleansers; since Mar. 1, 1937.

Trademarks reproduced and described include those appearing in Official Gazette of U. S. Patent Office, Oct. 31 to Nov. 21, 1944.

WASH-WELL
410,002

PLASTIK
410,017

ARIDAIR
410,399

Colorbrome
410,409

GRAPHO-DETECTOR
410,425

PHEENOROCK
457,506

SLAG-X
458,327

STANLEY
460,681

WORLD OVER TIZ
462,610

ATLANTIC REFINING COMPANY ATLANTIC
464,908

464,909

C & C 1
465,569

VRA 2
465,573

TRITON
466,932

EMULSEPT
467,562

VIS-COT
467,837

Coprein
469,807

UNISAN
470,036

FUNGIZYME
470,058

COROSOFOIL
471,291

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471,296

GOOD NEIGHBOR
471,415

FELTOSCOUR
471,475

CERROTRU
472,095

GOLD STAR
472,148

CELFON
472,321

NUODEX
472,431

PERSISTICIDE
472,503

PERSISTO
472,504

PERSISTOL
472,505

RAYOLENE
472,653

RAYTHRO

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472,773

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472,889

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472,907

RADUL
472,934

MELANTINE
472,936

SOLVADINE
472,938

TERGAVON
472,939

CRES-LITE
472,941

STIC-KLIP
472,946

RESLOOM
473,106

AIRCO
473,203

Lanaset
473,263

ROXALIN
473,398

VELVETOL
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